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THESIS

STRATEGIC PLANNING FOR THE FIRE SERVICE

by

Glen M. Holder
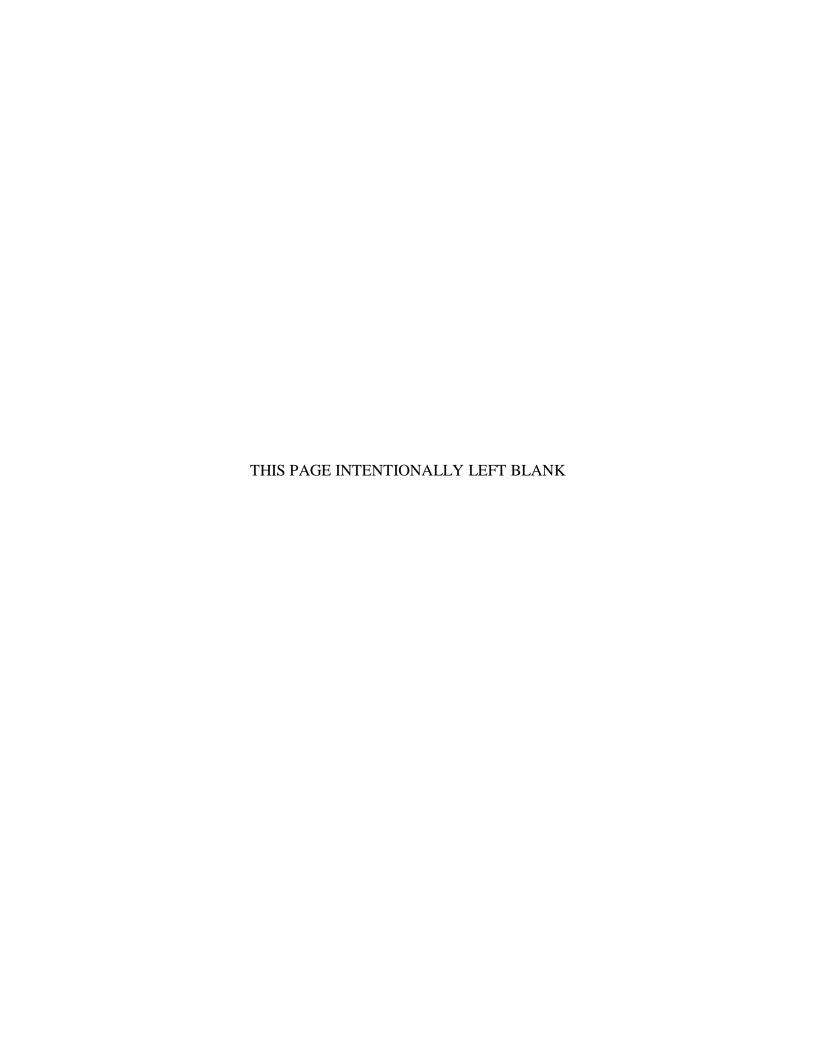
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   Three plausible future scenarios for the Fire Service have been created for this thesis using futures methodology. The drivers for these scenarios were drawn from FEMA's Strategic Foresight Initiative, which identified drivers that are expected to impact emergency managers' operations in the future. Conclusions range from the death of the Fire Service as we know it, to its transformation into a relevant business sector leader that embraces emerging mission requirements. The goal is to begin strategic conversations today that will shape the Fire Service of tomorrow.

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STRATEGIC PLANNING FOR THE FIRE SERVICE

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ABSTRACT

Fire Service leaders at large need a non-confrontational process to collaborate on a long-range strategic plan to shape the Fire Service over the next 20 to 30 years. Fire Service 2.0 conceptually calls for expanding interoperability between fire agencies over a large geographic region to increase service while decreasing costs. Futures methodology scenario planning would allow Fire Service leaders to think through plausible "what if" scenarios before they occur.

Three plausible future scenarios for the Fire Service have been created for this thesis using futures methodology. The drivers for these scenarios were drawn from FEMA's Strategic Foresight Initiative, which identified drivers that are expected to impact emergency managers' operations in the future. Conclusions range from the death of the Fire Service as we know it, to its transformation into a relevant business sector leader that embraces emerging mission requirements. The goal is to begin strategic conversations today that will shape the Fire Service of tomorrow.

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LIST OF ACRONYMS AND ABBREVIATIONS

CFAI   Commission of Fire Accreditation International
CPSE   Center for Public Safety Excellence

EMS   Emergency Medical Services
FEMA   Federal Emergency Management Agency
Fire 2.0   A future model of the Fire Service

GAO   Government Accountability Office

IAFF   International Association of Firefighters
ICS   Incident Command System
ISO   International Organization for Standards

NFPA   National Fire Protection Association
NICS   Next-Generation Incident Command System
NIMS   National Incident Management System
NIST   National Institute of Standards and Technology

OSHA   Occupational Safety Health Administration

SFI   Strategic Foresight Initiative
SP   Scenario Planning

UASI   Urban Areas Security Initiative

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EXECUTIVE SUMMARY

The 9/11 Commission found that U.S. emergency service agencies, due to the threat of terrorism, needed to adapt to the changing national and global political environment.[1] Homeland Security Presidential Directive 5, or HSPD-5, states that

> to prevent, prepare for, respond to, and recover from terrorist attacks, major disasters, and other emergencies, the United States government shall establish a single, comprehensive approach to domestic incident management. The objective of the United States government is to ensure that all levels of government across the nation have the capability to work efficiently and effectively together, using a national approach to domestic incident management. In these efforts, with regard to domestic incidents, the United States government treats crisis management and consequence management as a single, integrated function, rather than as two separate functions.[2]

The Fire Service is a primary responder to All Hazards requests for service. This responsibility puts Fire Service leaders at the center of a U.S. management crisis in need of change. The modern-day Fire Service delivery model encompasses consensus standards that evolved through extensive negotiations between labor, management, and elected officials,[3] but due to the system's complexity and its many stakeholders, the system now resists change.

Fire Service leaders recognize the warning signs. A survey of California state, national, and international fire chief conferences held during 2012 reported several common themes, including that

1. Government budgets were on the decline

2. Smaller agencies could increase administrative efficiency by mergers

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[1] National Commission on Terrorist Attacks upon the United States, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States*, 1st ed. (New York: W. W. Norton, 2004).

[2] Homeland Security Presidential Directive 5, "Management of Domestic Incidents," accessed February 12, 2013, http://www.dhs.gov/xabout/laws/gc_1214592333605.shtm.

[3] "Our History," IAFF (International Association of Fire Fighters), accessed February 12, 2013, http://www.iaff.org/about/history/ourhistory.htm.

3. Regional training could increase interoperability on mutual aid responses

4. Competition from private corporations threatened to take over public emergency medical services (EMS).[4]

As a systematic academic process tool, futures methodology scenario planning,[5] is used in this paper to explore complexity and unknown outcomes for the Fire Service. Scenario planning starts with the establishment of a collaborative group of representative division heads and decision makers in a fire agency. This group of subject-matter experts systematically researches drivers categorized in this paper as determinants, variables, and trends. This thesis used three sources of subject matter experts. The first group of drivers was developed based on concerns of fire chiefs expressed during California state, national, and international conferences. The second source was FEMA's Strategic Foresight Initiative, which identifies emerging trends expected to affect emergency managers. The last source is the author, a Fire Service leader with 25 years of experience working for the 8th largest city in the United States, San Diego The author provided the "boots on the ground" perspective to select specific drivers for this paper to showcase futures methodology. These drivers are issues that could affect the future of the Fire Service.

Once a set of determinants, variables, and trends is established, varying the weighted value of these drivers was used to produce differentiated plausible future scenarios. The goal of creating plausible future scenarios was for the collaborative group to change its current mental models and begin strategic conversations on how to maintain relevance and sustainability of their fire agency into the future. Complexity and uncertainty are addressed by the group by asking "what if?" questions.

This thesis offers three plausible scenarios:

- **Scenario 1**: "The Centurions" depicts a plausible future where the Fire Service has dramatically increased capabilities in the out-of-hospital

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[4] Bruce Evans, "Make No Mistake, Emergency Service Is Big Business," Fire Chief, March 1, 2011, http://firechief.com/ems/falck-enters-us-market-201103.

[5] Kees van der Heijden, *Scenarios: The Art of Strategic Conversation*, 2nd ed. (West Sussex, England: John Wiley & Sons, 2005).

public health care environment. The implementation of the Affordable Care Act weighs heavily on the outcome of the scenario.

- **Scenario 2**: "No Code Response" depicts a plausible future where the Fire Service has dramatically decreased in size. The Fire Service is no longer involved with EMS, and the mission has been taken over by private enterprise. Smart building technology has decreased the need for a geographic deployment model of the Fire Service.

- **Scenario 3:** "Get the Red Out!" depicts a plausible future of the Fire Service where Fire 2.0 has made the Fire Service a key stakeholder in the mission of the Department of Homeland Security.

Change is coming to the Fire Service. Futures methodology scenario planning is a process tool that allows Fire Service leaders to think through plausible outcomes before they happen. The goal is to begin strategic conversations to take action today, so that leaders can shape the Fire Service in the next 20 to 30 years.

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I. INTRODUCTION

Let the future tell the truth, and evaluate each one according to his work and accomplishments. The present is theirs; the future, for which I have really worked, is mine.

—Nikola Tesla,
20th century inventor and engineer

A. PROBLEM STATEMENT

The Fire Service has been undergoing a significant transformation over the last 40 years,[1] and there are calls for additional change. The 9/11 Commission—the group charged with providing a full account of the attacks—determined that U.S. emergency service agencies needed to adapt to the changing global political environment in order to successfully protect Americans from terrorism.[2] Homeland Security Presidential Directive 5, or HSPD-5, provides that all levels of government shall work together to have a "comprehensive approach to domestic incident management."[3] The Fire Service is a primary responder to All Hazards requests for service. This responsibility puts Fire Service leaders at the center of the U.S. national policy directive to implement change.

Change does not come easily, however. Anaheim, California-based Fire Chief Randy Bruegman feels the organizational culture of the Fire Service is resistant to change.[4] Nanaimo Fire Rescue Chief Craig Richardson thinks that a paradigm shift is coming to the Fire Service that will challenge the traditional deployment model through

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[1] Randy Bruegman, "Fire Service at a Crossroads- Opportunity for Innovation Is at Hand," ICMA Publications/PM Magazine, July 2014, http://icma.org/en/press/pm_magazine/article/104630.

[2] National Commission on Terrorist Attacks upon the United States, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States*, 1st ed. (New York: W. W. Norton, 2004).

[3] Homeland Security Presidential Directive 5, "Management of Domestic Incidents," accessed February 12, 2013, http://www.dhs.gov/xabout/laws/gc_1214592333605.shtm.

[4] Ibid.

educating members to achieve goals with a new way of thinking.[5] A University of Oklahoma white paper on an emergency medical service (EMS) evidence-based system design recognized that the best practices going forward will be challenged by labor, fiscal, and political realities.[6] New scientific methodologies are needed to challenge the current Fire Service's way of thinking and provide a scientific approach to decision making.

There are considerable costs when expanding the scope of services. The California Legislative Analyst's Office 2009–2010 budget series documented that CalFire's budget tripled in the decade before the report, with mission creep accounting for a 30 percent increase in requests for service to non-wildland-fire related calls.[7]

The Fire Service faces other challenges, as well. A survey of California, national, and international fire chief conferences held during 2012 reported several themes, including the following:

1. Government budgets were on the decline

2. Smaller agencies could increase administrative efficiency by mergers

3. Regional training could increase interoperability on mutual aid responses

4. Competition from private corporations threatens to take over public emergency medical services (EMS).[8]

The Fire Service must embrace change to remain relevant as a sector leader. Leaders need to develop an adaptive culture in order to prepare their workforce for

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[5] Tom Weczorek, "No Cause for Alarm, Sustainability in Fire Service Depends on Change," ICMA Publications/PM Magazine, July 2014, http://icma.org/en/press/pm_magazine/article/104606.

[6] Thomas H. Blackwell, Jeff J. Clawson, Marc K. Eckstein, Charles Miramonti, and Henry E. Wang, "Emergency Medical Services Evidence-Based System Design White Paper for EMS," University of Oklahoma, Emergency Medicine, July 2011, http://www.naemsp.org/MDC%20References%20for%20Website/OUDEM%20EMS%20System%20Design%20White%20Paper%20FINAL%20for%20July%202011%20Release.pdf.

[7] David Wallechinsky, "Mission Creep," AllGov, accessed June 21, 2015, http://www.allgov.com/usa/ca/departments/natural-resources-agency/department_of_forestry_and_fire_protection?agencyid=149.

[8] Bruce Evans, "Make No Mistake, Emergency Service Is Big Business," *Fire Chief*, March 1, 2011, http://firechief.com/ems/falck-enters-us-market-201103.

changes expected during the next 20 to 30 years. Failure to develop an adaptive culture has been shown to lead to the demise of business sector leaders.[9]

The modern-day Fire Service delivery model's *consensus standards*, standards agreed upon by all stakeholders, evolved over a long period through extensive negotiations among labor, management, and elected officials.[10] The complexity of the negotiation process makes adapting and changing difficult. The consensus standards need to continue to evolve; however, its many stakeholders resist that change.[11]

The tension between labor, management, and elected officials can create an environment where it is almost impossible to change existing consensus standards. Fire Service leaders face the daunting task of trying to lead their agencies to adapt to emerging mission opportunities, while addressing an internal observation that the service is a 100-year tradition unimpeded by progress. These leaders face what has been coined a *wicked problem*[12]—how to create an adaptive culture to prepare for emerging mission opportunities with a workforce steeped in tradition.

Adaptive business cultures maintain relevance and sustainability as sector leaders. Implementing scenario planning within the Fire Service could foster a relevant and sustainable organizational model. The goal for the Fire Service should be to provide top-level strategic leadership within the emergency management community.

And the groundwork does exist for the Fire Service to identify these drivers for change. For example, the U.S. government is providing strategic guidance for future

[9] Amy Zegart's theory of "adaptation failure" by the intelligence community that failed to discover information prior the events of 9/11 is applicable to other government organizations. Amy B. Zegart, *Spying Blind: The CIA, the FBI, and the Origins of 9/11*, 1st ed. (Princeton: Princeton University Press, 2009).

[10] "Our History," IAFF (International Association of Fire Fighters), accessed February 12, 2013. http://www.iaff.org/about/history/ourhistory.htm.

[11] Randy Bruegman, "Fire Service at a Crossroads—Opportunity for Innovation Is at Hand," *PM Magazine*, July 2014. http://icma.org/en/press/pm_magazine/article/104630.

[12] According to "An Introduction to Wicked Problems," a wicked problem "is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems." "An Introduction to Wicked Problems," Wicked Problems: Problems Worth Solving, accessed January 15, 2014. https://www.wickedproblems.com/1_wicked_problems.php.

demands on emergency managers. FEMA has developed an open source website that supports the Strategic Foresight Initiative (SFI), an initiative that seeks to shape behavior of emergency managers to address future challenges.[13] The SFI also identifies certain situations and scenarios that will affect future demands on the Fire Service. SFI describes drivers that may affect the Fire Service as U.S. demographics, universal access to and use of information, critical infrastructure, government budgets, technological innovation and dependency, and the changing role of the individual.[14] These strategic, emerging trends have potential long-range effects on the administration and operations of the Fire Service. Leaders need to understand the implications of these trends and begin planning strategies that could have long-term effects for future operational models.

Many of the FEMA SFI strategic trends may seem highly unlikely to occur. These types of scenarios have been identified as *black swans,* or rare events. The quandary of paradigm shifts and black swan events, such as Hurricane Katrina and the events of 9/11, is that, while they have a low probability, there are high costs when they do occur.[15] We know that these major disruptions happen.[16] In fact, a significant finding of the 9/11 Commission was that agencies need to adapt to the changing national and global political environment.[17]

What the Fire Service lacks is a mechanism for its members to imagine how coming changes will affect the discipline and to develop proactive strategies in response to that. This thesis proposes futures methodology scenario planning as a process will allow the Fire Service to develop new deployment models for emerging mission opportunities. Scenario planning produces plausible future outcomes to plan for desired

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[13] "Strategic Foresight Initiative," FEMA, May 29, 2013. http://www.fema.gov/strategic-planning-analysis-spa-division/strategic-foresight-initiative.

[14] FEMA, *Crisis Response and Disaster Resilience 2030: Forging Strategic Action in an Age of Uncertainty*, January 2012, https://www.fema.gov/media-library/assets/documents/24174?id=4995#.

[15] Ted G. Lewis, *Bak's Sand Pile: Strategies for a Catastrophic World* (Williams, CA: Agile Press, 2011).

[16] Paul Gilding, *The Great Disruption: Why the Climate Crisis Will Bring On the End of Shopping and the Birth of a New World*, 1st ed. (London: Bloomsbury Press, 2012).

[17] National Commission on Terrorist Attacks, *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks upon the United States* (New York: W. W. Norton, 2004).

outcomes and defend against undesirable ones.[18] Plausible future outcomes would allow Fire Service leaders to make better decisions to affect their future positively.

B.   RESEARCH QUESTION

The fundamental question addressed by this thesis is this: How can scenario planning shape the delivery of the Fire Service in the next 20 to 30 years?

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[18] Peter Schwartz, *The Art of the Long View: Planning for the Future in an Uncertain*, 1st. ed. (New York: Doubleday/Currency, 1991).

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II. EVOLUTION ON THE FIRE SERVICE DELIVERY MODEL

This chapter seeks to explore a range of issues affecting the Fire Service that create competing demands upon its leaders. These issues include the economic influence of declining budgets and the demands for public services; sustaining the National Fire Protection Association (NFPA) 1710/1720 consensus standards; the U.S. federal government's attempt to shape Fire Service policy through Urban Areas Security Initiative (UASI) grants; privatization of emergency medical services; and the poor public perception of the value of the Fire Service created by the 2007–08 financial crisis.[19] The complexity and interconnectedness of these issues without a long-range strategic plan affects the interests of labor, Fire Service leaders, and elected officials in the management of the Fire Service. When fire chiefs and elected officials balance competing interests, fire services inevitably are cut.[20]

A. INFLUENCES

1. Economic Issues

The 2007–2008 financial crises put tremendous pressure on the Fire Service.[21] The resultant cost-cutting measures slashed services, through either shutting down fire stations or eliminating positions.[22] This came during a period when the Department of Homeland Security (DHS) had sought to leverage state and local fire agencies to support national-level domestic security defense strategies against nuclear and biological threats. DHS created Urban Area Security Initiative (UASI) grants to provide financial incentives to fire agencies looking for alternative income streams.[23] UASI grant funding is tied to

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[19] Stewart Gary, *Fire Service Emerging Trends: The View from the Road* (Folsom, CA: Citygate Associates, 2011).

[20] Gary, *Fire Service Emerging Trends*.

[21] "Global Fire Service Leadership Summit—Education and Development," IAFC (International Association of Fire Chiefs), accessed December 7, 2012. http://www.iafc.org/Education/content.cfm?ItemNumber=4928.

[22] Gary, *Fire Service Emerging Trends*.

[23] "FY 2012 Homeland Security Grant Program," FEMA, accessed February 12, 2013, http://www.fema.gov/fy-2012-homeland-security-grant-program.

adoption of national strategies, such as the National Incident Management System (NIMS). The grant incentive shaped behavior as the financially strapped Fire Service sought to become more efficient during the fiscal downturn. To become more efficient, Fire 2.0 became a call to consolidate the administration, education, and training of smaller agencies into a collaborative effort to create a fiscally sustainable model of the Fire Service.

Fire 2.0 is offered as a future model for the Fire Service.[24] This model is the concept of a homogenous county-wide, state, or national fire service. Fire 2.0 calls for the establishment of training and operational standards in larger geographic areas to decrease administrative costs while increasing interoperability and training of participating fire agencies. This model would foster a common understanding among citizens, politicians, labor, and Fire Service personnel of how their community's needs are being matched to available resources that provide quality levels for the Fire Service.

The budgetary reductions in the Fire Service have affected the traditional geographic deployment model of resources.[25] This has resulted in the closing of fire stations or rotation temporary closures known as brown outs. New fire stations are not built in areas experiencing rapid housing development, leaving neighborhoods relatively unprotected.[26] The origin of the current NFPA 1710/1720 Fire Service deployment model was largely influenced by labor organizations.[27] The economic impact of fire station closures has a trickle-down effect to emergency medical services. With the implementation of the Affordable Care Act, also known as Obamacare, health care restructuring also will affect service delivery.[28] During this period of economic downturn, private-sector competition is increasing as fire departments nationwide deal

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[24] Gary, *Fire Service Emerging Trends*.

[25] Ibid.

[26] Ibid.

[27] "Our History."

[28] Gary, *Fire Service Emerging Trends*.

with legacy benefits.[29] The effects of these trends vary with the varying resiliency of local and national Fire Service agencies.

2.   Consensus Standards

The origins of the Fire Service deployment model have a convoluted history. The Fire Service labor unions put forth efforts in time, money, and political actions to achieve an operational standard. The same labor unions that developed consensus standards had a vested interest to maintain them in an environment where there were no laws or statutes dictating that local or state agencies must provide fire and EMS services.[30] Because of this, the geographic deployment model emerged, and with it, the concept that first-arriving units must be on scene within six minutes of an emergency.[31] The paradigm shift regarding personnel staffing for the Fire Service is to have an engine or a truck responding to a fire with four personnel, also known as the gold standard.[32] The calculated ability of a four-person crew to conduct fire suppression activities provides for rescue of possible fire victims trapped in the compartment of fire origin.[33] However, this kind of firefighting strategy directly affects firefighter safety. Fire Service leaders consider needed resources to respond to All Hazards and maximize firefighter safety. The National Fire Protection Association describes it as a delicate balancing act.

> The goal has been to identify major gaps in the needs of the U.S. Fire Service, where needs are identified by comparing what departments have with what existing 'consensus standards,' government regulations, and other nationally recognized guidance documents say they need to have in order to be safe and effective in conducting their many responsibilities.[34]

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[29] Ibid.

[30] Ibid.

[31] National Fire Protection Association, *NFPA 1710: Standard for the Organization and Deployment for Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (Quincy, MA: 2005).

[32] Ibid.

[33] Jason D. Averill et al., *Report on Residential Fireground Field Experiments* (Gaithersburg, MD: National Institute of Standards and Technology), http://www.nist.gov/manuscript-publication-search.cfm?pub_id=904607.

[34] National Fire Protection Association, *Third Needs Assessment of the U.S. Fire Service* (Quincy, MA: NFPA Fire Analysis and Research, October 2011).

Firefighter safety is used as political leverage to justify adopting consensus standards. The history of consensus standards for geographic deployment models and four-person staffing to address All Hazards has evolved primarily from political action of Fire Service labor unions.

The Occupational Safety and Health Administration (OSHA) "was created to assure safe and healthy working conditions for working men and women by setting and enforcing standards and providing training, outreach, education, and assistance."[35] The agency requires two-in, two-out, meaning an equal number of persons standby outside a potentially hazardous confined space should there be a need to rescue persons working inside. OSHA has the ability to cite and fine fire agencies to comply with the two-in, two-out regulations for operating inside active fires with hazardous breathing conditions. The two-in, two-out rule creates a buddy system for personnel safety while operating in dangerous atmospheric environments. OSHA is the only authority with the ability to enforce and regulate standards for the Fire Service. Fire Service labor unions influenced two-in, two-out OSHA regulations as the justification for four-person staffing to comply with the law.

The staffing and geographic deployment model has not been updated with a data-driven demand for service models of deployment similar to the ones used by the private sector EMS ambulances. Levels or tiers of service have not been standardized with data-driven analytical studies on a national level. To sustain any standard, local or state agencies must be able to maintain revenues that support the chosen standard. Politicians and citizens should have the ability to make risk-informed decisions based upon empirical science regarding their Fire Service needs and current revenues.

The National Fire Protection Association (NFPA) is a recognized authority on fire, electrical, and building safety.[36] The NFPA establishes the concept of "capability"

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35 "About OSHA," United States Department of Labor, Occupational Safety & Health Administration, accessed December 13, 2014, https://www.osha.gov/about.html.

36 "About NFPA," National Fire Protection Association, accessed June 21, 2014, http://www.nfpa.org/about-nfpa.

in its *Fire Protection Handbook*.[37] This capability is a combination of four personnel and equipment required to complete a set of established task at a structure fire. The rate of fire (time) development is discussed in "An Introduction to Fire Dynamics."[38] The concept is that fire will *flashove*r within six to eight minutes of fire start, consuming all habitable space. At the point of flashover, no survivors would be expected in the compartment. This sets the early standards to get enough people to the scene quickly enough to save lives and property.

The International Organization for Standards (ISO) is the world's largest developer of voluntary international standards.[39] The ISO standards allow insurers to compare clients against a standard by which the insurer can then provide insurance rates.[40] The ISO developed distance as a benchmark for a fire apparatus to respond: On a 10-point scale, 1.5 miles for an engine and 2.5 miles for a truck are the recommended distances. This Commission of Fire Accreditation International (CFAI) provides an alternative process to establish standards other than NFPA1710/1720. Established by the International Association of Fire Chiefs, CFAI states that "accreditation is a comprehensive self-assessment and evaluation model that enables organizations to examine past, current, and future service levels and internal performance, and compare them to industry best practices. This process leads to improved service delivery."[41]

Accreditation also addresses firefighter safety. According to *Fire Chief* magazine*,* "one of the common threads in the CFAI's self-assessment process since its inception in 1997 has been the safety of Fire Service personnel. There are 10 categories within the accreditation model, and virtually all 10 have a clear and compelling impact on the safety

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[37] Arthur E. Cote, ed., *Fire Protection Handbook* (Quincy, MA: National Fire Protection Association, 2008).

[38] Dougal Drysdale, *An Introduction to Fire Dynamics* (New York: John Wiley & Sons, 1999).

[39] "About ISO," International Organization for Standardization, accessed February 12, 2013, http://www.iso.org/iso/home/about.htm.

[40] Ibid.

[41] "About Accreditation," CPSE, accessed February 21, 2013, http://publicsafetyexcellence.org/agency-accreditation/about-accreditation-cfai.aspx.

of people in any Fire Service organization."[42] These three organizations—OSHA, NFPA, and ISO—create the framework that developed a geographic deployment model using four-person staffing.

Over time, the NFPA developed consensus standards that affirmed staffing models based upon geographic requirements. The goal is for the Fire Service to be able to respond to an emergency incident in six minutes or less 90 percent of the time.[43] NFPA 1221: Standard for the Installation, Maintenance and Use of Emergency Services Communications Systems established the standard of 60 seconds for a dispatch center to complete a call. NFPA 1410: Standard on Training for Initial Emergency Scene Operations established four-person training standards to staff a fire apparatus. NFPA 1500: Standard on Fire Department Occupational Safety and Health Programs established the minimum personnel requirement for fire incidents. NFPA 1710: Standard for the Organization and Deployment for Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments established a four-minute fire response time after one minute of turnout time to get on the apparatus. NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments (2010) maintained standards for volunteers. This literature review found that all fire departments strive to achieve four-person staffing for a geographic deployment model based upon the widely accepted NFPA 1710/1720 consensus standards.

There is a difference between a consensus standard and the law. OSHA is a federal agency with the power of law that has the ability to cite and fine fire agencies to gain compliance. 29 CFR-1910 OSHA: General Industry Regulations, established in 2011, defined the Fire Service as two-in, two-out policy. The intent of the OSHA regulation was to protect workers in a hazardous respiratory environment. An example is

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[42] "Safety, Self-assessment, CFAI," *Fire Chief*, accessed February 12, 2013. http://firechief.com/health_safety/firefighting_common_thread.

[43] Michael Cardwell, *Using National Standards to Create a Staffing and Deployment Plan* (Emmitsburg, MD: National Fire Academy, 2006).

the case of a welder succumbing to fumes while working in a tank and dying because no one saw the group go down. The International Association of Firefighters (IAFF) lobbied OSHA to include firefighters in this legislation.

OSHA issued one of the first Fire Service operational standards known as, "Fire Brigades," 29 CFR 1910.156 of 1980.[44]

> The IAFF was a driving force behind the standard, which issued requirements for the organization, training, and personal protective clothing and equipment fire brigades. The goal was to create minimum, acceptable standards that each fire department could follow—what personal protective equipment fire fighters wore and how they were trained. It gave the manufactures of the equipment a benchmark for protective equipment. This legislation was a milestone for fire fighters and the beginning of a mission to improve and standardize the Fire Service.[45]

This legislation later became the modern cornerstone for achieving four-person staffing.

3. Federal Influence on Fire Service Policy

DHS was founded in 2002 in the wake of 9/11. A series of Homeland Security presidential directives has become the focus of emergency managers and has shaped policy for all stakeholders of DHS.[46] The management strategy for domestic incidents falls under HSPD-5. The goal of National Preparedness for All Hazards, which includes domestic terrorism, man-made, and natural disasters, falls under HSPD-8.[47] These two presidential directives drive all other homeland security preparedness policies.[48] This top-down approach by the U.S. government is tied to grant funding and largely reflects "coercive federalism" to shape behavior of grant recipients.[49]

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[44] Fire Brigades, 29 CFR 1910.156 (2013).

[45] "Our History."

[46] Samuel H. Clovis Jr., "Promises Unfulfilled: The Suboptimization of Homeland Security National Preparedness," *Homeland Security Affairs* 4, no. 3 (October 2008): 3. https://www.hsdl.org/?view&did=234514.3.

[47] Clovis Jr, "Promises Unfulfilled," 6.

[48] Ibid., 2.

[49] Ibid., 6.

When 911 is activated, the Fire Service is a primary responder for almost every kind of emergency, which is captured in the All Hazards terminology. To create a national standard, HSPD-5 became the blueprint for how to respond in a manner common to all:

> The directive dealing with management of domestic incidents (HSPD-5) is an integral companion document to the national preparedness directive, because HSPD-5 directs the development of a national Incident Command System (ICS) and a National Incident Management System (NIMS), both of which are key elements of national preparedness policy implementation.[50]

NIMS provides the framework for the emergency management practice for the All Hazards approach.

When there are no terrorist threats, All Hazards and responses to natural disasters become the shield for justifying expenditures under DHS grants. The Fire Service can dual-purpose resources gained through UASI grants for non-terrorist-related emergencies.[51] The Fire Service is akin to FEMA in that it is in the minority of agencies falling under DHS. The larger majority of DHS is represented by law enforcement agencies.[52] The Fire Service contributes to preparedness with building and maintaining Urban Search and Rescue (USAR) teams that can deploy nationally: "The national government should lead this effort, and the effort should be predominantly dealt with through a partnership between DHS, the Department of Justice (DoJ) and the Department of Defense (DOD)."[53] The Fire Service can maintain increased capability by responding to events considered normal accidents, such as annual hurricanes, in between the infrequent domestic terrorist events.

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[50] Ibid., 2.

[51] "Grant Details," Homeland Security Grants Info, accessed December 13, 2014, http://www.homelandsecuritygrants.info/GrantDetails.aspx?gid=17162.

[52] Christopher Bellavita, "Changing Homeland Security: Twelve Questions from 2009," *Homeland Security Affairs Journal* 6, no. 1 (January 2010). https://www.hsdl.org/?view&did=30031." 25.

[53] Samuel H. Clovis Jr., "Twelve Questions Answered," Homeland Security Affairs 6, no. 2 (May 2010): 3, https://www.hsdl.org/?view&did=24925.

One of the policy guidelines of HSPD-8 that has had a direct bearing on the Fire Service is the grant selection process. Grant awards were intended to be calculated based upon population density and presence of critical infrastructure.[54] Due to the complexity and stipulations of the accountability process, jurisdictions with fewer than 50,000 residents are unable to employ emergency management staff to administer the grant process.[55] The grant process subverts state and local governments' influence by circumventing the political process and unfunded costs fall back upon the grant recipient over the long term.[56] As a result, funds often are redirected from general services to public safety budgets.[57] The federal government uses a form of federalism that is coercive in nature.[58] This coercive process causes change at the local level to support strategic policy at the national level. The disconnects between the state, local, and federal government stem from the fact that all major emergencies begin at the local level. By compelling behavior change to support national strategy, the local and state governments' basic public services suffer.[59]

Labor unions have used similar tactics to achieve their goals. The IAFF lists on their history page the following:

> Through federal government studies and tragedies like those in Houston, the IAFF found that operating with below minimum staffing is a leading cause of fire fighter fatalities. Recognizing that the foremost need of the fire service is adequate staffing, the IAFF proposed and convinced Congress to enact the Staffing for Adequate Fire and Emergency Response Firefighters Act of 2003 (SAFER). This law authorized funds to hire up to 75,000 new fire fighters over a seven-year period. Under SAFER, fire departments can apply for federal grants to help pay the costs associated with hiring new staff. Previous to SAFER, the IAFF worked to secure federal grants under the Firefighters Investment and Response

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[54] Clovis Jr., "Twelve Questions Answered," 7.

[55] Samuel H. Clovis Jr., "Federalism, Homeland Security and National Preparedness: A Case Study in the Development of Public Policy," *Homeland Security Affairs* 2, no. 3 (October 2006): 13, https://www.hsdl.org/?view&did=467451.13.

[56] Clovis Jr., "Federalism, " 6.

[57] Ibid.

[58] Ibid.

[59] Ibid., 13.

Enhancement (FIRE) Act, which provides federal grant money to increase staffing.[60]

At face value, the efforts of the IAFF are laudable in that they achieve increased firefighter safety through increased personnel staffing. Smaller agencies that have used the UASI program find themselves with an unfunded liability once the grant money has run out. Politicians may find themselves in a position where they may have to lay off firefighters, raise taxes, or reduce services in other areas if UASI grants decline. The reduction of other public services to the exclusion of public safety has decreased the public's perception of their Fire Service.[61]

4.   Privatization of Emergency Medical Services

A standard used by the Fire Service in deploying EMS units comes from the American Heart Association (AHA). Cardiac arrests account for between 250,000 and 450,000 deaths per year prior to reaching a hospital.[62] There is a three-phase model of cardiac death created by Myron L. Weisfeldt and Lance B. Becker.[63] The electric phase lasts the first five minutes immediately after the cardiac arrest. This is the period when the patient has the highest survival success rate with electro-shock therapy delivered by an external defibrillator.[64] The next phase, the circulatory phase, lasts five minutes. During this phase, the body goes into a metabolic acidosis and requires aggressive CPR to restore circulation prior to administration of an external defibrillator. This circulatory phase has a lower survival rate in the pre-hospital environment.[65] The last phase is the metabolic phase, which is 10 minutes after the cardiac arrest. The survival rate for this phase "remains elusive. Attempts to find the best strategy to improve the survival rates

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[60] "Our History."

[61] "Global Fire Service Leadership Summit—Education and Development," IAFC (International Association of Fire Chiefs), accessed December 7, 2012. http://www.iafc.org/Education/content.cfm?ItemNumber=4928.

[62] Garza et al., "Improved Patient Survival Using a Modified Resuscitation Protocol for Out-of-Hospital Cardiac Arrest," *American Heart Association Journal*, February 23, 2009, http://circ.ahajournals.org/content/119/19/2597.full?sid=ef4822c3-79c5-4da6-93e1-5eb9a99403dc.

[63] Ibid.

[64] Ibid.

[65] Ibid.

for these patients remain challenging."[66] The goal of the Fire Service EMS would be to intercept the patient as early as possible to gain the greatest chance of saving the patient.

The first five minutes of a cardiac arrest, the electrical phase, is used in determining the deployment strategy for arriving at scene to begin patient treatment within six to eight minutes. While the AHA guideline has no force of the law, it is used to justify geographic Fire Service EMS deployment models. Privatization of EMS services gives politicians and city managers a lower-cost option as compared to the cost of legacy pay and benefits of the traditional Fire Service. Falck, a European fire and EMS provider, is now the largest ambulance company in America.[67] Falck is not burdened with legacy personnel benefits or under the consensus standards that the Fire Service has to honor. This has drawn capital infusions from private equity firms seeking to profit from a public/ private partnership.[68]

5.   Public Perception of the Fire Service

Since the 2007–2008 financial crisis, the Fire Service at the state and local levels has been under budget restraints that have often resulted in decreased service.[69] Because of this, the public's perception of the Fire Service has changed from a positive view to a negative one, due to the Fire Service receiving more in personnel benefits than their service is worth.[70] This poor public perception comes during a period of mission expansion in the Fire Service to encompass All Hazards with a national domestic preparedness standard.[71] Directed by presidential directives, DHS, through federal grant awards, has shaped state and local policy to support national domestic preparedness strategies. These grants have often included funding stipulations that draw budget resources away from public safety.

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[66] Ibid.

[67] Bruce Evans, "Make No Mistake, Emergency Service Is Big Business," *Fire Chief*, March 1, 2011, http://firechief.com/ems/falck-enters-us-market-201103.

[68] Ibid.

[69] Jeffrey M. Wallin, "Identifying Staffing Model Options for the Moorhead Fire Department," 3.

[70] "Global Fire Service Leadership Summit."

[71] Clovis Jr., "Promises Unfulfilled," 1.

Fire departments nationwide are struggling to meet the fire operations and personnel safety criteria of the DHS, National Fire Protection Association (NFPA), Occupational Safety Health Administration (OSHA), and International Organization for Standards (ISO). The high cost of supplying fire services may take money away from other social programs during fiscally constraining times.[72]

Social media is being used on local and national levels as a means to positively change public perception. It mimics the social structure of close friends, acquaintances, and strangers,[73] and the public at large is clearly engaged. In fact, Facebook's statistics page states that the company had "1.55 billion monthly active users on average for September 2015."[74] According to an estimate by the U.S. Government Accountability Office, social media use equates to about one out of four minutes, or 25 percent of online usage.[75] The private sector's use of social media to market itself has been widely embraced, and this technology has proven successful, as evidenced by growth and profitability. The public sector also has sought to capitalize on this technology by establishing accounts and networks in the same manner as does a citizen. This strategy is one that acts upon the existing technology.

The hierarchal nature of the public sector is clashing with the emergent nature of a transparent social media interface. There is a great opportunity for public agencies to partner with private agencies as subject matter experts. Public agencies already act like a super user. Private agencies could leverage marketing technology in order to provide critical feedback to government users. This partnership loop would likely increase the success of the public sector. Establishing trust with the private sector would be beneficial prior to actual emergencies. This is an opportunity for the government to develop better relationships with private partners.

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[72] Gary, *Fire Service Emerging Trends*.

[73] Brian L. Mayer, *Modern Social Media and Social Revolutions* (Fort Leavenworth, KS: U.S. Army Command and General Staff College, December 16, 2011), https://www.hsdl.org/?view&did=703593.

[74] "Statistics," Facebook Newsroom, accessed January 20, 2016, http://newsroom.fb.com/company-info/.

[75] Government Accountability Office, *Federal Agencies Need Policies and Procedures for Managing and Protecting Information They Access and Disseminate* (GAO 11–605) (Washington, DC: GAO, 2011).

During an emergency, social media allows government agencies to estimate damage, build situational awareness through crowd sourcing, and communicate to the citizens in a two-way fashion in order to collect information while providing valuable resources and information to the public. The use of social media rises on mobile platforms and Internet-based home computers during an emergency.[76] Uploaded pictures can contain metadata embedded in the image including GPS coordinates, date, and time of recording.[77] Mobile applications have been created for many major government agencies. These applications draw feed off of multiple sources, and this allows for rapid burst two-way communications of information on conditions that can change dramatically moment by moment. FEMA tweeted suggestions to 157,000 subscribers on how to communicate to relatives and loved ones their status during telephone network congestion via social media.[78] This illustrates how social media can be used by government agencies to better serve citizens.

Challenging the current ethos of the Fire Service would draw fierce opposition by labor and the culture of the Fire Service itself. The current consensus standards were backed by labor unions. Failure of the Fire Service to become adaptive to emerging missions could result in increased competition for the privatization of services. Politicians, lobbied by labor unions over concerns for public safety, strive to meet established consensus standards. When funding resources do not match needs, other public services are reduced. Politicians who reduce or restructure Fire Service models to fit financial resources can suffer politically. The public's support for the Fire Service may reach a tipping point where the perception of services rendered is not worth the cost. For the Fire Service to remain competitive against privatization, growth in service to the public should be made while reducing costs and generating new revenue sources.

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[76] Gadi Ben-Yehuda, *Hurricane Sandy: How Government Uses Social Media for Disaster Response* (Washington, DC: IBM Center for the Business of Government, October 26, 2012). http://www.govexec.com/excellence/promising-practices/2012/10/hurricane-sandy-four-ways-government-uses-social-media-disaster-response/59052/.

[77] "FEMA Independent Study Program: IS-42 Social Media in Emergency Management," FEMA, July 18, 2012, https://training.fema.gov/EMIWeb/IS/is42.asp.

[78] Jacqueline Baylon. "Hurricane Sandy Coverage: FEMA Uses Social Media to Keep People Informed," Digital First Media, October 30, 2012.

6.   Current Long-term Strategies for the Fire Service

The U.S. Fire Administration National Emergency Training Center Library maintains a database of Executive Fire Officer (EFO) papers written since 1986. These EFO papers were written predominately by members within the Fire Service who received at least a "B" grade on their paper. A search of the EFO database found that 149 papers have been filed into the database since 1986 under the search term "strategic planning."[79] In context, an estimated 30,052 fire departments operate in the United States.[80] A sampling of EFO papers revealed three basic themes regarding strategic planning: short-range, long-range, and budgets.

> Planning can be divided into two phases: short-range planning and long-range planning. Short-range planning would include 5 to 10 years in the future. In this scenario, the short- and long-range plans would be adjusted on an annual basis as needed. The short-range plan would be reflected in the annual operating budget.[81]

Poor future policy planning could result in undesirable consequences down the road.[82] In Paul Aligica and Kenneth Weinstein's 2009 book on Herman Kahn, they conclude that "it has usually been lack of imagination, rather than excess of it, that caused unfortunate decisions and missed opportunities."[83] One aspect of technical competence is to recognize that a current system will need to be modified or replaced as its relevance increases or decreases.[84] Customary arguments against change are often from specialized, unexamined, and self-serving claims. This can be detrimental to the stakeholders' best interest.

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[79] EFO Database, accessed August 7, 2015, http://usfa.kohalibrary.com/app/search/subject: (%22strategic%20planning%22)?itemtype=%22EFO%22.

[80]Hylton J. G. Haynes and Gary P. Stein, *U.S. Fire Department Profile 2013* (Quincy, MA: NFPA Fire Analysis and Research, November 2014).

[81] Donald F. Favreau, *Fire Service Management* (New York: International Fire Administration Center for Executive Development, 1969).

[82] Paul D. Aligica and Kenneth R. Weinstein, *The Essential Herman Kahn: In Defense of Thinking* (Lanham, MD: Lexington Books, 2009).

[83] Aligica and Weinstein, *The Essential Herman Kahn*, 157.

[84] Ibid., 158.

The EFO strategy papers sampled appeared to be largely crafted by individuals in a leadership position for direct implementation within their particular fire agency. Examples of single agency-level strategic planning papers, written for the NFA EFO program, include Hagerstown Fire,[85]Chambersburg Fire Department,[86]Pompano Beach Fire Rescue,[87]Midwest City Fire Department,[88]and the Chesterfield Emergency Communications Center.[89] The authors recognized a need for a strategic plan at the local level, and they used various business theories to develop a plan for the local level. However, there did not appear to be any mention of a singular cohesive strategic planning process among the sample of papers.

Strategic planning should recognize emerging trends and act to shape the Fire Service to sustain leadership in emergency management. A historic example of slow adoption of a significant technology is CPR. The Fire Service responds to patients in cardiac arrest in out-of-hospital settings. The American Heart Association started the CPR program in 1960.[90] The emergence of lifesaving CPR as a trend was not codified as part of a national emergency management strategy for 10 years. The National Registry of Emergency Medical Technicians was established in June 1970.[91] This event is the origin of the emergency medical technician (EMT) certification and establishment of national standards for medical care (CPR) provided by field EMTs. California did not adopt the trend of EMT standardization or formally act upon a strategy for another 10 years.

[85] Mark Cleck, "Strategic Planning for the Hagerstown Fire Department," National Fire Academy, accessed August 7, 2015, http://www.usfa.fema.gov/pdf/efop/efo46289.pdf.

[86] John A. Vanlandingham, "Strategic Planning for the Chambersburg Fire Department." National Fire Academy, 2005, http://www.usfa.fema.gov/pdf/efop/efo37793.pdf.

[87] Michael J. Hohl, "Strategic Plan for Pompano Beach Fire Rescue-Ocean Rescue Division," National Fire Academy, accessed August 7, 2015, http://www.usfa.fema.go

[88] Jarett L. Metheny, "Developing Strategic Plans," National Fire Academy, accessed August 7, 2015, http://www.usfa.fema.gov/pdf/efop/efo46070.pdf.

[89] Paul L. Newton, "Strategic Planning for the Chesterfield Emergency Communications Center," National Fire Academy, accessed August 7, 2015, http://www.usfa.fema.gov/pdf/efop/efo32186.pdf.

[90] "History of CPR," American Heart Association, accessed August 7, 2015.http://www.heart.org/HEARTORG/CPRAndECC/WhatisCPR/CPRFactsandStats/History-of-CPR_UCM_307549_Article.jsp.

[91] "Milestones," National Registry of Emergency Medical Technicians, accessed August 7, 2015, https://www.nremt.org/nremt/about/HistoryandMilestones.asp.

California established the Emergency Medical Services Authority in 1980, and it was to develop and coordinate EMS programs, such as CPR, statewide.[92] There will always be personality-driven Fire Service leaders who will be early proponents for change. This example demonstrates the Fire Service reacting to change instead of leading through change. There appears to be a need to establish a process to address emerging trends that could shape the future of the Fire Service.

The number of EFO papers committed to strategy as compared to the number of fire agencies gives an indication of the lack of a national framework for Fire Service strategic planning; 149:30,052. As Nicholas J. Caputo states in "Developing a Strategic Planning Process, "The Division currently has no formal strategic planning process in place. The Division's current long-range plan (master plan) was developed, published, and distributed in 1998."[93] A typical five-year business plan or 10-year fire apparatus replacement plan is valuable at the local level for budgeting purposes, but it is not a solution to recognize emerging trends and posture for emerging mission requirements. This theme seems in direct opposition to the Fire Service value of strategy and tactics. Without a strategic plan, the best strategy could fail due to unrecognized changing conditions for the Fire Service. Michael P. Wallace finds that "there was relatively little nationally published literature on the criteria to use for Fire Department Strategic Formulation"[94] Caputo noted a lack of strategic planning through the following common themes in the literature:

> (1) the inability of fire service organizations to agree on the components of a strategic plan, (2) the inability of fire service organizations to agree on the length of time that a strategic plan should be formulated, and (3) the unwillingness of fire service organizations to model the private sector.

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[92] "History and Background," California Emergency Medical Services Authority, accessed August 7, 2015. http://www.emsa.ca.gov/About_EMSA.

[93] Nicholas J. Caputo, "Developing a Strategic Planning Process," Strategic Planning, National Fire Academy, accessed August 7, 2015, http://www.usfa.fema.gov/pdf/efop/efo34802.pdf.17.

[94] Michael P. Wallace, *Strategic Formulation Process for Strategic Planning—The Salem New Hampshire Fire Department* (Emmitsburg, MD: National Fire Academy, Executive Fire Officer Program, December 2001), http://www.usfa.fema.gov/pdf/efop/efo33499.pdf.

Fire service literature stresses the need to have a strategic plan, but a validated process to model is nearly non-existent.[95]

There does not appear to be a national or state strategic plan to shape the future of the Fire Service. Local fire agencies focus on a 5- to 10-year strategy developed with budgets in mind. There does not seem to be a coordinated methodology within the Fire Service at large to identify emerging trends and anticipate paradigm shifts that could shape the Fire Service of the future.

B.   CONCLUSION

The Fire Service solidified its current service model through the influence of several factors. Economic conditions, good or bad, affect the Fire Service with modifications to the service levels provided. Consensus standards for the current configuration over firefighter staffing models developed over time, largely driven by labor. The federal government has affected Fire Service policy through the application of UASI grants that are tied to implementation of federal standards. Private entities are also competing to deliver comparable emergency services. During times of economic distress, the public's perception of the Fire Service can influence politicians and managers to modify personnel benefits, which can lead to decreases in service. The Fire Service does not have a national cohesive strategic-planning process to meet emerging trends and potential paradigm shifts. These influences and interwoven demands upon Fire Service leaders and labor leaders, as well as the public officials who make policy, have shaped the modern Fire Service. The interdependencies of these issues create an environment that is resistant to change. Emerging Fire Service mission opportunities will require an adaptive workforce culture that accepts change as a normal part of meeting new demands for service.

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[95] Caputo, "Developing a Strategic Planning Process," 20.

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III. LITERATURE REVIEW

The literature review is divided into two major focuses: the evolution of the current Fire Service delivery model, consensus standards known as NFPA1710/1720,[96] and established business strategies for addressing complex problems. The current model of the Fire Service has been shaped by economic influences, political lobbying to establish industry standards, "coercive federalism,"[97] threats from privatization, and the public's perception of the Fire Service.[98] These elements create a complex management environment for the Fire Service, and there a large body of academic research addresses this complexity.

In this section, business theories that address complexity and consider aspects of decision-making thought processes are discussed and evaluated. By understanding how humans manage thought and creativity, the Fire Service can make decisions now, recognizing plausible outcomes for the future environment of the Fire Service. Futures methodology scenario planning is explored as a tool to address both complexity and uncertain future outcomes in the Fire Service.

A.   BUSINESS STRATEGIES FOR TACKLING COMPLEX PROBLEMS

Change your thoughts, and you change your world.

—Norman Vincent Peale,
American minister and author

Academic methods can be used to test changing conditions in industry sectors. Business methodologies to help industry sector leaders manage complexity in changing business climates. The speed of technological advancements is causing unanticipated disruption for industries operating within a traditional business mindset, often to their

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[96] National Fire Protection Association, *NFPA 1710: Standard for the Organization and Deployment for Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (Quincy, MA: NFPA, 2015).

[97] Clovis, Jr., "Promises Unfulfilled," 6.

[98] "Our History."

demise as sector leaders. Local Fire Service leaders embroiled in the daily management, administration, and operations may have little situational awareness of the macro issues that may shape the future of the Fire Service. Business theories that deal with change management take human behavior into account. Resistance to change and decision-making are identified from academic study of human psychology and sociology. Academic research has established that industry sector leaders who create a workforce culture of adaptability maintain relevance and sustainability in a complex environment subject to disruptive change. Fire Service leaders who pursue a singular NFPA 1710/ 1720 consensus standards strategy could paradoxically be subject to failure with disruptive technologies and services emerging in the private sector.

1.   Creativity, Innovation, and Change

Have you ever had an innovative idea dismissed by your supervisor? A few weeks later, your great idea comes back during the implementation process with someone else's name on the project. This appears to be a common theme within the bounds of creative diversity. Why is that? This phenomenon has been termed by Michael Kirton as the Paradox of Structure.[99] The Paradox of Structure illustrates how a lack of understanding creativity diversity can cause conflict within the hierarchy of people working together for common goals.

Penn State University created a massive online course (MOOC) during 2013 on their Coursera website titled *Creativity, Innovation, and Change*. The course explored the differences in how people think creatively. The MOOC examines a creative diversity model, based upon the research of Kirton, Robert Sternberg, and Teresa Amabile.[100] Their creative diversity model has three assumptions:

1. Creativity can be classified into four styles: revolutionary, evolutionary, simple, and complex;

[99] Jack V. Matson, Kathryn W. Jablokow, and Darrell Velegol, "Creativity, Innovation, and Change," Penn State University Coursera, August 5, 2013, https://class.coursera.org/cic-001/wiki/view?page=pos.

[100] Matson, Jablokow and Velegol, "Creativity, Innovation, and Change."

2. Creativity is diverse, not all people are creative in the same way, no one style of creativity is valued above another, and creative diversity values the possibilities across all people; and

3. Creative diversity is described with four variables: creative level, creative style, motive, and opportunity.

To solve complex problems or create innovative ideas, the MOOC emphasized changing people's perspective on the value creative diversity to collaborate.

Kirton, Sternberg, and Amabile found that creative level is based on a person's native intelligence, knowledge, skill, and life experience. Creative style is how a person intuitively works with knowledge. Some individuals have very organized thought processes, which represents an evolutionary type of creativity. People with a less structured thought process represent a revolutionary type of creativity.[101] A person is born with a dominant creative style. People can learn to work with other creative styles, appreciating that differences can strengthen a collaborative effort. Motive is the term used to express how people are internally compelled to express creativity.[102] Motivated people spend more time and energy being creative. Opportunity is a set of circumstances that allow people to use their creative capacity to problem-solve. The MOOC introduced terminology to enable participants with a common framework to discuss the power of creative diversity in order to produce innovative ideas in a collaborative process.

Evolutionary creative style stays within the confines or an organizational structure and manifests in incremental ideas.[103] If there is an existing mousetrap, an evolutionary style will creatively figure out how to make it better incrementally. The revolutionary creative style works from outside the current confines or organizational structure and thereby can develop disruptive, out-of-the box ideas.[104] A revolutionary person will figure out a whole new way to catch mice. When a revolutionary person approaches an evolutionary person with a new, abstract idea, the evolutionary person will reject the

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[101] Ibid.

[102] Ibid.

[103] Ibid.

[104] Ibid.

concept initially because it does not fit within his or her normal confines or organizational structure. Over time, the idea marinates within the evolutionist, who will then adopt the idea and implement it. The revolutionist relies upon the evolutionist for the implementation of a new concept. Revolutionary people can create paradigm shifts, while evolutionary people are better at creatively implementing the paradigm shift. Evolutionists fare better as managers during stable business environments, and revolutionists often fare better at leadership during times of innovation and change. The two styles are interdependent. Futures methodology scenario planning, which will be addressed later in the thesis, fosters an environment where different creative styles productively collaborate with each other.

2.   Nudge: Improving Decisions about Health, Wealth, and Happiness

The *nudge* is the concept of influencing the choices people make in a socially responsible manner.[105] Libertarian paternalism is a term that describes the strategy for choice architects in constructing a nudge.[106] The use of the word "libertarian" implies that people should have the freedom to make their own choices. The use of the word "paternalistic" describes the altruistic motivation of the choice architects. Libertarian paternalism is defined as influencing "people's behavior in order to make their lives longer, healthier, and better."[107] Public policy choice architects construct a nudge in a manner that influences public behavior without reducing options or seeking economic incentives. Business uses the nudge principles to market services and products but not always in a paternalistic manner. An example illustration this in business is the positioning of products on a grocer's shelf. Products at eye-level draw the consumer better than other options on the top and bottom shelves. The nudge concept is built upon research by social scientists who explain why humans have flawed forecasts and biases, terms associated with how people make choices.[108]

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[105] Richard H. Thaler and Cass R. Sustein, *Nudge: Improving Decisions about Health, Wealth, and Happiness*, 2nd. ed. (London: Penguin Books, 2009).

[106] Thaler and Sustein, *Nudge*.

[107] Ibid., 5.

[108] Ibid., 7.

There is a false assumption and two misconceptions about human behavior that explain the choices humans make. The false assumption is that all people make the best decisions for their own self-interest.[109] The first misconception is that people cannot be influenced in their decision making, and the second misconception is that paternalism equates to coercion.[110]

There are two distinct organic processes and theories of thought—developed by Daniel Kahneman—that evolved to describe how human beings make choices.[111] Kahneman called system one an automatic mode of thinking and system two a purposeful system of thinking.[112] The automatic system is instinctive, developed through repetition, and requires little or no purposeful "thought." When a person sees a lion, the natural immediate decision is to run away. The reflective system is purposeful thought that requires mental effort to make choices. Solving a challenging math problem such as, "I drove 200 miles on 10 gallons of gas, what is my gas mileage?" is an example of a purposeful thought process. People have developed gut-thinking and conscious thought.[113] Together these principles can explain how people make decisions.

Choice architects understand the workings of the human thought process and seek to create improved choices for the betterment of society. People unconsciously make decisions built upon prior experiences and do not think much about how they made the choice. Choosing a common food item, such as chocolate or vanilla ice cream, comes almost without any thought because it is based upon previous choices.[114] "Anchoring" is a term used to describe how a person makes a decision based upon a known value, and then makes a decision based upon the assumption that the anchor is accurate.[115] A common marketing example of anchoring could be, "This shirt is 50 percent off of its

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[109] Thaler and Sustein, *Nudge*, 9.

[110] Ibid., 19.

[111] Ibid.

[112] Daniel Kahneman, *Thinking, Fast and Slow*, 1st ed. (Farrar, Straus and Giroux, 2011).

[113] Kahneman, *Thinking, Fast and Slow*, 21.

[114] Ibid., 22.

[115] Thaler and Sustein, *Nudge*, 23.

original price of $30." The anchoring bias of this logic is that the shirt may never have been worth $30 in the first place. The term *availability* describes exposure to risks and the perception of how much is gained or lost through exposure to that risk. Driving on the freeway is statistically riskier than becoming the victim of a terrorist act. The everyday availability of driving desensitizes a person's perception of the actual high risk of being in an accident. People generally perceive the risk of being attacked by a terrorist as high. This perception is false based upon a person's statistical actual availability to a terrorist attack.[116] Other mental biases are representativeness, optimism and overconfidence, and gains and losses.

The knowledge of these mental processes is used by choice architects in the creation of a nudge. Once a choice is developed by the architects, how that choice is framed is critically important in the nudge process. The term *framing* describes how the same choice can be offered differently.[117] For example, "If you hurry, you can make the movie on time," versus "Watch out! There are police looking for speeders." With no further information about the factual content of these statements, the way the same choice is framed allows a person to think about their choices differently. Futures methodology scenario planning can leverage the concept of availability, anchoring, and framing during the development of future scenarios. The choice architects of plausible future scenarios can influence people to think through a situation before it occurs. Scenario planning can nudge people into beginning strategic conversations.

3.   Thought Processes and "Fast Failure"

Penn State University professor Jack V. Matson explains the concept of intelligent fast failure in the MOOC Creativity, Innovation, and Change course.[118] There are two types of thought processes to gather and focus idea generation. *Divergent* thinking is in "generating multiple ideas, solutions, or alternatives," and *converge*nt thinking refines

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[116] Ibid., 25.

[117] Ibid., 36.

[118] Matson, Jablokow and Velegol, "Creativity, Innovation, and Change."

those ideas through "evaluating and selecting from among the alternatives."[119] Using the background of scientific experimentation, Matson uses an example of how failing faster allows individuals to get to a correct answer faster. In a linear fashion, conducting one experiment after another is time-consuming. Conducting multiple experiments at the same time decreases the amount of time it takes to arrive at the correct answer. Scenario planning is divergent, generating many ideas (experiments) to establish drivers that affect an industry. Scenario planning then becomes convergent as it fast fails drivers down to a manageable number. The implication of intelligent fast failure should challenge organizations to diverge a large pool of ideas with the intent of converging them quickly them quickly.

4. Kahn's Defense of Thinking

Herman Kahn is considered to be the founding father in the field of futures studies.[120] What brought fame to Kahn was his seminal strategic discourse on the future of the grand strategy and thermonuclear war.[121] He made key contributions on the issues of geostrategy of war and peace, culture and economic development and their relationship to one another. He also tackled problems with futures study and the need for a broad multi-disciplinary approach, tensions between decision makers' and academics' approach to the future, cultural change in affluent societies, and global economic development.[122] Kahn's tremendous contributions on the future of these weighty matters brought them to the forefront of public debate.

The approach to large-scale multifaceted future problems was embraced by Kahn, who established a new scientific methodological process now termed futures methodology. His philosophy on Western cultural trends and the tasks ahead framed the use of futurology. Futures methodology is a modern growth-oriented ideological process to make decisions today that affect the future. Kahn took the long view perspective on

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[119] Ibid.

[120] Aligica and Weinstein, *The Essential Herman Kahn*, 1.

[121] Ibid., 2.

[122] Ibid.

economic growth and cultural change. Kahn contributed to the discourse on disputes regarding limits to growth and the doomsday theses put forth by the Club of Rome.[123] It was in this area of study that Kahn began work involving analysis through futures scenario development. He developed a methodological framework for plausible alternative futures that would use future-oriented policy research, the agnostic use of information, scenario building, classes of variables, and the problems associated with technological innovation.[124] Kahn recognized that futures studies would need to be broad and rely on collaborative efforts of experts in varied disciplines who combine their knowledge in a productive manner.

The purpose of studying the future is to make better decisions today, which will positively affect the future. As Aligica and Weinstein note, poor future policy planning could result in undesirable consequences down the road: "It has usually been lack of imagination, rather than excess of it, that caused unfortunate decisions and missed opportunities."[125] One aspect of technical competence is to recognize that a current system will need to be modified or replaced as its relevance increases or decreases.[126] Customary arguments against change are often from specialized, unexamined, and self-serving claims. This can be detrimental to the stakeholder's best interest. Kahn identified the policy objective of futures methodology

> (1) To stimulate and stretch the imagination and improve the perspective, (2) To clarify, define, name, expound, and argue major issues; (3) To design and study alternative policy "packages" and contexts; (4) To create propaedeutic and heuristic expositions, methodologies, paradigms, and frameworks; (5) To improve intellectual communication and cooperation, particularly by the use of historical analogies, scenarios, metaphors, analytic models, precise concepts, and suitable language; (6) To increase the ability to identify new patterns and crises and to understand their character and significance; (7) To furnish specific knowledge and to generate and document conclusions, recommendations, and suggestions; (8) To clarify currently realistic policy choices, with emphasis on those that retain efficiency and flexibility over a broad range of contingencies;

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[123] Aligica and Weinstein, *The Essential Herman Kahn*, 3.

[124] Ibid.

[125] Ibid., 157.

[126] Ibid., 158.

(9) To improve the "administrative" ability of decision-makers and their staffs to react appropriately to the new and unfamiliar.[127]

Making informed choices is significantly better than decisions made by omission or ignorance. Having several choices or alternatives gives more meaning to what is ultimately selected. This provides decision makers the negatives and positives associated with costs for differing outcomes. Taking different points of view into account increases the perceived fairness of implemented policy decisions. A measure of success with the application of futures methodology is that it produces the groundwork for increased discourse.[128] Increasing discourse has the potential to encourage further futures studies that could lead to more productive recommendations and suggestions.[129]

5.   Planning for the Future

Planning decisions made today should include a long view of how those decisions will unfold. Peter Schwartz, former chairman of the Global Business Network, became one of the best scenario planners in the world.[130] His method of analysis in building future scenarios provides an "imaginative leap into the future."[131]

The scenario-building process contains many steps. The process begins with setting a timeframe on how far into the future the scenario will be based—five, 10, 20, or more years into the future. The next step is to conduct in-depth research of the business sector to include non-traditional sources, such as fringe publications and remarkable people.[132] An important element in scenario planning is to determine driving forces and factors that will affect their outcomes. Some driving forces are predictable and predetermined, while others can provide critical disruption in future outcomes.[133] The

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[127] Ibid., 155.

[128] Ibid., 164.

[129] Ibid.

[130] Kees Van der Heijden, *Scenarios: The Art of Strategic Conversation,* 2nd. ed. (West Sussex, England: John Wiley & Sons, 2005), xiiii.

[131] Peter Schwartz, *The Art of the Long View: Planning for the Future in an Uncertain*, 1st. ed. (New York: Doubleday/Currency, 1991), xiii.

[132] Schwartz, *The Art of the Long View*, xiv.

[133] Ibid., xiv.

identified drivers become the foundation to develop plots for building plausible future scenarios. The desired outcome of scenario building is to think about the big "what if?" implications of a scenario if it were to actually come to pass.[134] Scenario planning allows for complexity in decision making. Scenarios are intended to challenge mental models of established organizations by revealing potential blind spots in their strategic decision making. Challenging the established mental models of an organization leads to strategic conversations of self-examination that can result in better strategic prioritizing and decision making.[135]

Scenarios are based upon basic human plots that have reoccurring historic underpinnings. French historian Fernand Braudel wrote a three-volume work titled *Civilization and Capitalism 15th-18th Century*.[136] In this volume, Braudel identified the common underlying plots of shifting political alliances leading to internationally linked economies, changes to economic models in the capitalist cycle, and changes in the daily activities of people's lives. These three levels individually have inherent logic, which in turn, affects the whole, as indicated by the simultaneous rising and falling of fortunes at all three levels. This has led to a common phrase, "rising tides float all boats." The evolution of these concepts or plots remains a constant and recognizable pattern within political alliances.[137] Scenarios use similar logic in plot development. By examining the effect of driving forces of the past, plausible outcomes, using variations or weights, can be developed for future scenarios.[138]

Strategic scenarios often fall into three broad narrative plots.[139] One plot looks at more of the same, only it gets incrementally better with time. Another plot looks at changes for the worse. The last plot examines a paradigm shift that is entirely different but improved at the end of the cycle. There is not a specific scientific formula for writing

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[134] Ibid., xv.

[135] Schwartz, *The Art of the Long View.*

[136] Ibid., 135.

[137] Ibid.

[138] Ibid.

[139] Schwartz, *The Art of the Long View*, 19.

a scenario. The methodology looks at factors and elements that can be used as plot techniques for scenario development. In scenario development, "there is no prescription for (writing) an effective story."[140]

Schwartz describes the nature of plots and identifies three reoccurring themes. Plot scenarios are based upon the behavior or nature of economic cycles, political systems, advancing technologies, and social perceptions.[141] The three main plots are winners and losers, challenge and response, and evolution. One scenario, depending on how it is written, should be designed to scare management leaders into action, without shutting down their engagement in the "what if?" process, thereby creating a call to action.[142] Winners and losers propel characters into a world of limited resources.[143] This plot is a zero-sum gain where only one side wins.[144] Political elections are based upon this plot: there is no office for the loser to hold. Winners and losers assume that both parties cannot benefit from divided resources. Challenge and response are derived from the original script-writing technique of historian Arnold Toynbee.[145] The protagonist endures one unexpected test or trial after another. After each test, the character emerges with personal growth gained by achieving a different perspective learned through the response to a challenge. "Ironically," Schwartz says, "America's history had been a continual succession of challenge and response stories."[146] Evolution is a slow growth or decline that is hard to identify if the participants are not familiar with the affected system. This plot element does not bring sudden surprises.

Today, the most common sector of evolution is technology. But Schwartz explains that "technology entrepreneurs often fail to predict their own growth (mental model) because they don't take … learning time into account; they don't see

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[140] Ibid.

[141] Ibid., 138.

[142] Ibid., 139.

[143] Ibid., 141.

[144] Ibid., 149.

[145] Ibid., 145.

[146] Ibid., 145.

technological growth as a process of evolution-the development of new niches."[147] Technology tends to control the economy where it is evolving the fastest. Schwartz also identifies that individuals rarely shape cultural shifts. Collective changes in "mental models" and thought processes of companies, institutions, and nations ultimately drive cultural shifts.

While Schwartz points out that there is no single recipe or formula for the development of scenarios, he does identify steps to develop scenarios. In the appendix of *The Art of the Long View*, he lists the following steps:

- Identifying focal issue or decision

- Pinpointing key forces in the local environment, driving forces

- Ranking by importance and uncertainty

- Selecting scenario logics

- Fleshing out the scenarios and implications

- Selecting leading indicators and signpost[148]

Schwartz also offers up some general rules for scenario development.[149] If there are too many scenarios, they will lose distinction between the storylines, becoming variations of the same theme. If there are too few scenarios, the tendency is to frame them as good, bad, and middle-of-the-road outcomes. Scenarios should avoid assigning probabilities; this distinguishes scenarios from forecasting and predictions. The naming conventions of scenarios have a pivotal role in capturing the reader's attention and framing the internal logic of the plots. The development team for the scenarios should include three sets of people: upper management composed of those who make and implement decisions, a broad range of representatives from across the business's operations, and imaginative open-minded individuals who work well in group settings.[150] Scenarios should be plausible and have the effect of breaking mental models of

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[147] Ibid., 148.

[148] Ibid., 246.

[149] Ibid., 247.

[150] Schwartz, *The Art of the Long View*, 248.

traditional operational stereotypes. Scenario building requires the participation and input of decision makers who take real ownership of the process, otherwise the methodology will fail. These combined general rules are Schwartz's basis to building good scenarios about which strategic decisions can be made for the future.

6.   Challenges of New Technologies

Clayton Christensen studied why great companies failed to remain top industry leaders after declining to invest in emerging disruptive technologies.[151] The innovator's dilemma is that "the logical, competent decisions of management that are critical to the success of their companies are also the reasons why they lose their positions of leadership."[152] Christensen looked at four principles: companies depend on customers and investors for resources, large companies require large markets for growth, markets must exist if they are to be analyzed, and technology supply is not necessarily equal to market demand.[153] Christensen termed the dilemma as "principles of disruptive innovation."

Trying to meet the demands of customers today may not position a business sector to supply changing customer demands in the future. Products and services in emerging technologies may not have an immediate customer demand, and, initially, these emergent technologies may not appear useful to current customers. The demand curve and pace of today's markets often do not mirror the development curve of emerging technology.[154] While customer service is a key component in successful marketing strategies, those very customers cannot be expected to lead business sectors in developing innovative products and services. Customers cannot tell you what they will demand tomorrow. Successful marketing techniques do not always take into consideration disruptive new technologies. Ignoring customer demands and investing in emergent technologies that produce smaller margins today is an acceptable risk for long-term

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[151] Clayton M Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Boston: Harvard Business School Press, 1997), viii.

[152] Ibid., xiii.

[153] Ibid., xix, xx, xxi, xxii.

[154] Christensen, *The Innovator's Dilemma*, 208.

business survival strategies of management.[155] Current customers are not expected to know what they will want in the future; business must anticipate and plan for them.

The challenge for business is to manage resource allocation toward future product research and development while sorting through the complex choices of emerging innovation technologies. As Christensen describes, "it was disruptive technology that precipitated . . . leading firms' failure."[156] Innovation and the resource allocation process go hand in hand; innovative product proposals' success directly reflects the amount of resources allocated to the developmental process. Business is driven by sustaining profitability. This principle creates a culture within the workforce that incrementally refines their current products. Focusing on the current product-development process continues until decreased demand diminishes profitability margins. At the point when a business recognizes the need to develop an emerging technology, the business is often already behind the product-development curve to compete with its own version of the innovative technology. This continually challenges managers to focus on disruptive technologies with potential future profitability. This can be compounded by the lack of current market demand. These management decisions must occur while providing for current market demands.[157]

Current technologies are sustained by refinement and giving consumers more of or better versions of what they already have

> because these firms listened to their customers, invested aggressively in new technologies that would provide their customers more and better products of the sort they wanted, and because they carefully studied market trends and systematically allocated investment capital to innovations that promised the best returns, they lost their positions of leadership.[158]

This represents meeting market demand with currently available technologies. According to Christensen, "executives can simultaneously do what is right for the near-

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[155] Ibid., xii.

[156] Ibid., xv.

[157] Ibid., 208.

[158] Christensen, *The Innovator's Dilemma*, xii.

term health of their established businesses, while focusing adequate resources on the disruptive technologies that ultimately could lead to their downfall."[159]   Disruptive technologies cannot be forced upon current consumer markets. Finding the new niche market for disruptive technologies is the challenge, not finding the technology itself. The historical successful path forward is to find new markets that value the characteristics of disruptive innovation (early adopters).[160]

New markets for disruptive technologies challenge the existing internal business structures designed to meet an established market sustainment business model. Most business sectors are fairly specialized with capabilities created for current technologies of their market sector. Sustaining technology fosters improved product performance.[161] Business can stay within the markets for which they are specialized and achieve profitable gross margins. Disruptive technologies emerge in smaller scales that are not profitable for the production scale that a business was designed to meet for existing customers.

An existing business model with its product development cycle and production process is not inherently able to rapidly compete against disruptive new technology. A dramatic comparison would be an auto manufacturer that produces 100,000 vehicles per year to shift to building 10 commercial jet planes per year from the same facility. The two production process will not mesh together. As Christensen states, "the pace of technological progress can, and often does, outstrip what markets need."[162] New markets with demand for disruptive technology often require a completely different set of capabilities for development and production.[163]

A business model focused on the development of a product or service often does not have information or resources to invest in disruptive technology. Initial entry into disruptive technology can result in failures as adjustments are made to develop a new

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[159] Ibid., xiv.

[160] Ibid., 209.

[161] Ibid., xv.

[162] Christensen, *The Innovator's Dilemma*, xv.

[163] Ibid., 209.

capability. Many successful large companies that started out with a disruptive technology lose their original vision and mobility to embrace disruptive technology.[164] Managing failure and the risk of failure leaves maneuvering ability to continue developing ideas needed to commercialize disruptive innovations.[165]

Disruptive innovations have distinct economic advantages in markets for companies that become the first-movers. There are two business models that have proven to be successful business strategies. The first-mover model uses disruptive technology development to gain competitive economic advantage over time. The sustainment model represents incremental improvements in existing technologies as an economic advantage over time. First-mover models require a high degree of leadership while the sustainment model does not. While one might think disruptive technology would achieve higher returns, over time both business strategies fare equally well.[166]

Companies planning to enter disruptive technology markets face a dilemma. The early investment in disruptive technology is directly in conflict with a sustainment business model: "The dilemma in managing the disruptive technology in the heat of the battle is that nothing went wrong inside these companies (who failed)."[167] The business cycles of sustainment have overwhelming resources in brand names, management experience, established distribution logistics, and technology in production. As Christensen says, "customers and financial structures of successful companies color heavily the sorts of investments that appear to be attractive to them."[168] Highly successful companies do not see the need to make any changes to their business model.

Managerial decisions that directly supported existing business models were at the root of a company's failure and fall from leadership in their industry sector.[169] Chasing an emerging disruptive technology did not make economic sense to the company at that

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[164] Ibid., 24.

[165] Ibid., 210.

[166] Ibid.

[167] Christensen, *The Innovator's Dilemma*, 73.

[168] Ibid., xv.

[169] Ibid., 93.

time.[170] This allows entrepreneurs and first movers to gain a competitive advantage with implementation of disruptive technology to meet future market demand.[171] Established companies can de-conflict the two business models of sustainment and disruptive technology through understanding this concept. A sector-leading company can address this dilemma by exposing existing customers to new technology without impeding their current market demands. Scenario planning would allow Fire Service leaders to explore emergent ideas without financial commitment.

7.   Strategic Planning

Strategic management schools of thought and the planning process are the focus of the *Strategy Safari* by Bruce Ahlstrand, Henry Mintzberg, and Joseph Lampel. The concepts from these schools of thought are the underlying basis for undergraduate and MBA strategy courses; strategy is described as "a pattern, that is, consistency in behavior over time."[172] These are the 10 *Strategy Safari* schools of thought:

- The Design School: strategy formation as a process of conception

- The Planning School: strategy formation as a formal process

- The Positioning School: strategy formation as an analytical process

- The Entrepreneurial School: strategy formation as a visionary process

- The Cognitive School: strategy formation as a mental process

- The Learning School: strategy formation as an emergent process

- The Power School: strategy formation as a process of negotiation

- The Cultural School: strategy formation as a collective process formation

- The Environmental School: strategy formation as a reactive process

- The Configuration School: strategy formation as a process to transformation.[173]

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[170] Ibid., 121.

[171] Ibid., 210.

[172] Ibid., Kindle location 164.

[173] Ahlstrand, Mintzberg and Lampel, *Strategy Safari*, 91–97.

The first three schools are prescriptive in nature; they describe how the process should be done. The next six schools describe how to strategize. The last school—transformation—configures all the others in an integrative fashion during the strategy process.

The Strategy Safari five "P"s of strategy are plan, pattern, position, perspective, and ploy. The different management schools of thought are implemented by these. A plan is the intended strategy; a pattern is a deliberate strategy; a position is the strategy of locating markets; a perspective is the underlying process of an organization's way of conducting business; and lastly, a ploy is a strategic maneuver to outwit an opponent or competitor.[174]

The concepts frame an overall strategy that has three inputs. The first P, intended strategy, develops into the second P, a deliberate strategy. Emergent strategy can asymmetrically feed into the deliberate strategy. These three elements form the eventual real-world outcome of a grand strategic plan.[175]

Strategic management is its own discipline.[176] The teaching of strategic management focuses on the schools of design, planning, and positioning.[177] Strategic managers focus on the schools of formulation, implementation, and control.[178] All strategic schools have their own advantages and disadvantages. Ahlstrand, Mintzberg, and Lampel state that "the field of strategic management is embracing a synthesis of all 10 views to develop a full tool box of techniques.[179] A strategic process addresses all 10 schools, similar to how a chef combines ingredients in a culinary dish.[180]

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[174] Ibid., 208.

[175] Ibid., 193.

[176] Ibid.

[177] Ibid.

[178] Ahlstrand, Mintzberg and Lampel, *Strategy Safari,* Kindle location 312.

[179] Ibid., Kindle location 193.

[180] Ibid., Kindle location 5117.

Complexity and unstable environments call for a complex strategy.[181] Complexity is usually not addressed in strategic management.[182] The ending concept of *Strategy Safari* is termed, "the beast called strategy formation,"[183] which combines the 10 schools of thought and the five "P"s of the strategic planning process. The "beast called strategy formation" could address complexity by providing a toolbox for strategic scenario planners during the strategy formation process.

8.   Scenario Planning

Scenario planning looks at the elements of why scenario planning is needed, the planning practice, principles of scenario thinking, and principles of strategic thinking. Scenario planning can provide for strategic flexibility, adaptation, and speed, which are needed in a complex and fast-paced environment.[184] The term "dynamic capabilities," first introduced in 1997 by Gary Pisano and Amy Shuen, captures adaptation and speed of change as the ability to answer disruptive innovation with "creative destruction of existing competences"[185]

The dynamic capabilities of an organization are compared to the U.S. Air Force's model of assessing a pilot's learning ability known as the OODA Loop.

> The OODA Loop is the cycle of observation (sensing environmental signals), orientation (interpreting), decision (selection from a repertoire of responses), and then action (executing a response). Fighter pilots with faster OODA Loops tend to win dogfights.[186]

Organizations are compared with U.S. Air Force pilots as needing the ability to react fast enough to survive in a competitive environment. A strategic response capability is defined as the "grand challenge" of balancing flexibility and stability.[187] Scholars and

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[181] Ibid., Kindle location 5012.

[182] Ibid., Kindle location 5020.

[183] Ibid., Kindle location 5193.

[184] Mats Lindgren and Hans Bandhold, *Scenario Planning—Revised and Updated Edition: The Link Between Future and Strategy*, 2nd ed. (New York, NY: Palgrave Macmillan, 2009), 5.

[185] Lindgren and Bandhold, *Scenario Planning*, 6.

[186] Ibid., 6.

[187] Ibid., 7.

practitioners of complexity theory maintain that business success depends upon a robust strategy that is flexible and adaptable.[188] Simulators used to prepare fighter pilots are estimations of future unknown engagements. The simulator prepares the pilot's mind to not only survive a deadly engagement but also to thrive through the dogfighting process. Scenario planning is a similar process: it gives organizational strategic planners practice at thinking, reacting, and making decisions through plausible future events before they occur.

A description of the future based upon the projection of today is a forecast. Projection of a desired future is called a vision. Scenarios address "what if?" questions about the future.[189] Forecast and vision processes often conceal risk—it does not take into account disruption—but strategic planning, utilizing scenario planning, allows for risk management. "Scenarios are vivid descriptions of plausible futures."[190] Short-term planning uses forecast and projections. Scenario planning looks further into the future. The longer the scope of time, the more the future becomes more complex due to uncertainty. Scenario planning can be a valuable tool for managing risk and uncertainty of a future environment.[191]

There are several characteristics of scenario planning. A scenario should produce a pleasing narrative that can be visualized by the reader. Planners enable divergent thinking, allowing for brainstorming ideas. A scenario should reduce complexity for the reader. Scenarios are, by design, mechanisms to increase communications that might not have another venue. Scenarios are supposed to leave some uncertainty in conclusions: Could this happen or not? They often are counterintuitive to management's business-as-usual mental model. Scenarios provide soft methods and soft answers, allowing managers room to maneuver. Lastly, scenarios can be time-consuming in their development.[192]

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[188] Ibid., 10.

[189] Ibid., 22.

[190] Ibid., 23.

[191] Ibid., 27.

[192] Ibid., 31.

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Attributes of good scenarios contain the following criteria.[193] They should provoke action—they should be useful individually and as a group to aid decision makers in the strategy planning process. The scenarios must be plausible illustrations of future events. Each scenario should provide alternative plausible futures over a range of possible future events. Every group of scenarios must be consistent with internal logic. The range of scenarios should show enough differentiation in structure to prevent variations of only one theme. Scenarios names should be attention-getting and easy to remember. A group of three to five scenarios needs enough vivid differentiation that each scenario makes enough impression on the reader to become memorable. The last attribute of scenarios is that they should ultimately challenge the organization's conventional mental model of the future. Contrasting scenarios reframe the context of an organization's mental model. They allow exploration of "what if?" questions. The desired outcome of scenario planning is to allow better decisions to be made that will affect a business' future.[194]

The "practice" of scenario planning is presented as a five-step method called TAIDA.[195] *Tracking* is used for the purpose of tracking and describing changes that affect the organization today. *Analyzing* those changes will become the basis to developing scenarios. *Imaging* generates a set of realistic futures used to develop vision for the desired future. *Deciding* which strategies to be used based upon vision is developed to address threats, visions, and goals. *Acting* is how scenario planning develops a course of action steps to meet strategic vision and goals. The TAIDA method uses these five steps to develop three contrasting futures: desired, probable, and possible.

There are seven principles of scenario planning presented in *Scenario Planning: The Link between Future and Strategy*. They provide a start on how to think differently about thinking:

1. Get yourself a toolbox is applied to improving the thought process using techniques, methods, and tools.

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[193] Ibid., 32.

[194] Ibid., 33.

[195] Ibid., 49.

2. Handle your brain with care; humans are prone to thinking processes developed for survival and success.

3. Think in dramas describes each actor as dependent upon the influence of all the other actors to create a perspective of the future.

4. Think in futures starts with what might happen, and then works outward from there.

5. Think about uncertainties pertain to the task of risk management.

6. Think in systems concerns how independence, dependencies, and inter-connections affect an organization from outside to inside the box within the existing structure.

7. Strategic moves use the scenario as a chess game to work through what strategic moves the organization would make considering the opponent's intentions, interventions, actions, and strategic moves.[196]

Then seven principles of strategic planning presented are "think in paradoxes, think in visions, think in jamming, think in time, think in resources, think in life cycles, and think in experiments and bets."[197] Thinking in paradoxes is the strategic management responsibility to address growth, profitability, innovation, and efficiency. Thinking in visions helps organizations to reevaluate and set new reference points. What would a new normal look like? Thinking in jamming is a musical metaphor where an organization maintains a steady rhythm while introducing improvisation with pragmatism. Thinking in time is related to jamming in the sense that missed timing ruins the beat. Missed emergent opportunities can be critical to an organization's future success. Thinking in resources challenges an organization's established business processes to be viewed as a resource that needs to become renewable. A non-renewable business today can be a liability in the future. New resources should be created while old resources need to be retired. Thinking in life cycles is the awareness that current demands can change for an organization. Without planning for emerging demand, an organization can diminish or fail in a predicted business cycle. The last principle is to think in experiments and bets. An organization can conduct smaller-scale attempts or experiments with emerging

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[196] Lindgren and Bandhold, *Scenario Planning*, 118.

[197] Ibid., 145.

opportunities. Calculated bets with experiments could result in exponential gains for the future. Strategic planning for the long-term future using scenario planning manages risk while promoting long term competitiveness with a complex uncertain future.

9.   Exploring the Future

Edward Cornish begins his futures study by looking at the great explorers of the past. Using the analogy of great explorers, he identifies seven traits that begins with the need to "prepare for what you will face in the future."[198] This leads to anticipating future needs. This can be difficult in dealing with what is unknown. Cornish continues on to illustrate how great explorers often used "poor information when necessary."[199] Great explorers where prepared to "expect the unexpected" due to the nature of possibly encountering unanticipated situations, and this leads to preparation in the thought process of "think long term as well as short term."[200] The thought process includes "dreaming productively"[201] to envision the goal before it is achieved. Cornish finishes with the intention to "learn from your predecessors."[202] These concepts are the starting point for how futurists examine trends that could change and transform our future.

Cornish identified six supertrends that have the capacity to change how we live in the future. Technological progress is the capability for humans to achieve their purpose more effectively.[203] Economic growth is a self-sustaining process that allows for generational advancements building upon the accumulation of wealth that will in turn speed up the process of productivity for future generations.[204] Improvements in health care through better food, sanitation, and medicine could lead to increased longevity that

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[198] Edward Cornish, *Futuring: The Exploration of the Future* (Bethesda, MD: World Future Society, 2005), 2.

[199] Cornish, *Futuring*, 3.

[200] Ibid.

[201] Ibid., 7.

[202] Ibid.

[203] Cornish, *Futuring*, 23.

[204] Ibid., 24.

effects population growth and average age of populations.[205] Increasing mobility has the capacity to increase the inter dependence of commerce and people globally. The downside is in transmission of disease and cultural clashes from colliding societies.[206] Environmental decline as a result of high population growth and economic development could lead to diminished resources.[207] Increasing deculturation or loss of traditional cultures results in culture shock through a nontraditional manner. With increased mobility, deculturation occurs in an individual's country of origin through mass migration of people, goods, and services.[208] The supertrends identified by Cornish could create disruption or paradigm shifts in the future. The strategic planners of today would do well to learn the lessons of the early great explorers; the near future could be the next unexplored wilderness.

The development for futuring methods discussed by Cornish include consulting experts, and using very serious games, models and simulations, and visioning.[209] The specific method types he identifies are "scanning, trend analysis, trend monitoring, trend projection, scenarios, polling, brainstorming, modeling, gaming, historical analysis, and visioning."[210] Cornish describes scenarios as "the future development of a trend, a strategy, or a wild-card event may be described in story or outline form. Typically, several scenarios will be developed so that decision makers are aware that future events may invalidate whatever scenario they use for planning purposes."[211] Scenarios can address uncertainty by addressing what might happen. Cornish identifies five types of scenarios that can be used imaginatively for future events:[212]

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[205] Ibid., 25.

[206] Ibid., 26.

[207] Ibid., 27.

[208] Ibid., 29.

[209] Ibid., 65.

[210] Ibid., 79.

[211] Cornish, *Futuring*, 79.

[212] Ibid., 97.

1. **A Surprise-Free Scenario:** Things will continue much as they are now. They will not become substantially better or worse.

2. **An Optimistic Scenario:** Things will go considerably better than in the past.

3. **A Pessimistic Scenario:** Something will go considerably worse than in the past.

4. **A Disaster Scenario:** Things will go terribly wrong, and our situation will be far worse than anything we have previously experienced.

5. **A Transformative Scenario:** Something spectacularly marvelous happens-something we never dared to expect.[213]

Cornish reasons that the purpose of scenarios is to use identified factors to develop thought provoking value questions. Scenarios by nature are broad rather than precise. What scenarios can provide is the ability to think about plausible futures and how to make better strategic decisions about how they could affect the future of an organization.[214]

10.   Strategic Conversation

The preface of the book, *Scenarios: The Art of Strategic Conversation*, begins with a conversation between futures authors Kees van der Heijden and Peter Schwartz. The conversation links the futures methodology of scenario planning with the art of strategic conversations. Van der Heijden point out that *Scenarios* is about organizational strategy: "The words, 'scenarios' and 'strategic conversation' in the title indicate some aspects of strategy that I judge are undeveloped in the literature."[215]

Van der Heijden views scenarios as a process tool in the strategic planning analytical process. He looks at three essential strategies: rationalist, evolutionary, and processual. The rationalist assumes that there is only one solution, and the strategist's job is to find it. In the scenario planning discipline, a founding father Pierre Wack was of the opinion that reperceiving was looking hard enough at a given situation until another

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[213] Ibid. 98.

[214] Ibid., 79.

[215] Van der Heijden, *Scenarios*, xv.

perception of it was developed.[216] Van der Heijden references another strategist, Henri Mintzberg, and his concept of the evolutionary paradigm. This is an emergent view that attempts to develop a concept before it happens. There is an illusion of control but with uncertainty; Mintzberg's view was that of "the fall of strategic planning."[217] The third strategy is a processual one. This view is that in a fast-paced and changing environment, a good process matters more than a perfect one.[218] By the time a business could come up with a perfect process, the opportunity has already changed: "Mental agility is what counts."[219] Van der Heijden's view is that all three have a place in the strategy. The most significant element of the strategic process is that the strategic conversations about the organization as a whole produce better decisions than if only one person makes critical decisions.

Van der Heijden looks at three kinds of conversationalists "people with the power to perceive, those with the power to think, and those with the power to act."[220] This is a collaborative act that leverages the learning of many as opposed to few. The value-added part of the conversation leverages the individual's learning and talents in a loop of thinking, acting, and creating that builds a whole community. The management of the strategic conversation is practical in nature, while the spontaneous thoughts that arise are an emergent element that produces power in the conversation. This requires a commitment to open communication of an organization. Management's role becomes that of an organizational facilitator for scenario planning.

The goal of these strategic conversations is to change the mental model of management's perception of their role in future markets.[221] There are two extremes to be avoided: fracturing and group think. Fracturing—disagreements within a planning group—creates too much divisiveness and often results with stakeholders in

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[216] Ibid., x.

[217] Ibid., x.

[218] Ibid., xi.

[219] Ibid., xi.

[220] Ibid., xii.

[221] Ibid., xiii.

organizational processes shutting down, potentially failing the business. Group think—consensus thought—misses the purpose of establishing multiple mental models. Van der Heijden that this is "where scenarios come in, They are the best tool I know to allow the conversation to reflect different perceptions of the situation."[222] Business requires original invention, and original invention requires seeing things from a different perspective. Scenarios are the reframing tool that allows an organization to see what changes are driving their future. During the scenario building process and strategic conversations, the goal is for an emergent idea or Eureka! moment to occur that an organization can commercialize going forward.

11.   Undermining Success

Michael Raynor looks at the quandary of businesses development cycle in the context of an uncertain future. The nature of the future makes it unpredictable. The Strategy Paradox is that "strategies with the greatest possibility of success also have the greatest possibility of failure. Resolving this paradox requires a new way of thinking about strategy and uncertainty."[223] One concept Raynor describes is *strategic flexibility,* which is a way of managing uncertainty. Scenario building is offered as a method for an organization to develop strategies for the future based upon core and contingent elements.[224] These two elements, strategic flexibility and scenario building, form the basis for a sustained business model in an ever-changing environment.

Strategic flexibility creates a division that does not interfere with normal operating divisions as a way to deal with uncertainty.[225] Raynor examines three elements of business: constraints, transcending constraints, and creating strategic flexibility. Constraints on a business include resource constraints (money and time), structural constraints (scope and scale), and strategic constraints (customers and risk).[226]

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[222] Ibid., xiv.

[223] Michael E. Raynor, *The Strategy Paradox: Why Committing to Success Leads to Failure (and What to Do about It)* (New York: Doubleday/Currency, 2007), 1.

[224] Ibid., 231.

[225] Raynor, *The Strategy Paradox*, 177.

[226] Ibid., 179.

Transcending constraints take into consideration the option of establishing a division that is adaptable on a smaller scale. The advantage of creating a division within an organization rather than a standalone business is in the minimization of overall risk for the strategy paradox.[227] Strategic flexibility is

> creating the real options required to implement new, different, effective, commitment-based strategies on a tempo defined by competitive markets can only be done in the spaces beyond constraints. Consequently, only the corporate office can devote resources to operating outside of the constraints that bind operating companies' actions.[228]

The strategic flexibility cycle is a four-part loop: anticipate, formulate, accumulate, and operate. Without committing the whole organization to the strategy paradox, a strategic flexibility division minimizes risk while searching for a large opportunity of future growth.

Interestingly, Raynor finds that "scenario building allows a company to formulate optimal strategies and identify core and contingent elements."[229] He uses an analogy of the stock market to illustrate calculated risk. Some stocks are risky but pay high returns. Some stocks are stable but produce lower returns. The financial theory of an *efficient frontier* is to diversify in many stocks rather than investing in a single stock. This strategy produces higher returns with a lower risk.[230] Scenario planning allows the exploration of multiple plausible futures in search of creating an "efficient frontier" return through strategic flexibility.

12.   Change versus Adaptation

Author Amy Zegart used the events of 9/11 as a high-profile backdrop to introduce her model of organizational adaptation failure. In *Spying Blind*, Zegart spends the second and third chapters of her book developing the nuance of change versus adaptation. The U.S. intelligence community can be used as an analogy for all

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[227] Ibid., 186.

[228] Ibid., 192.

[229] Ibid., 231.

[230] Raynor, *The Strategy Paradox*, 232.

government agencies. Zegart's claim is that intelligence community agencies changed a little and completely failed to *adapt* to the new counter terrorism mission: "Using different mailing labels is change. Launching an entirely new graduate degree program is an adaptation."[231] Zegart offers three key characteristics for adaptation: change, magnitude of change, and that the major changes result in an improved fit with the organization and what is happening outside of it.[232]

> The data indicate a widespread inability of the U.S. intelligence agencies to adapt to the terrorist threat before 9/11. Of the 340 recommendations for changes in the intelligence community, only 35—just 10 percent of the total—were fully implemented.[233]

The failure within the basic organizational structure to adapt in the intelligence community is claimed as the primary reason for failure of the emerging anti-terrorist mission to prevent the attacks on 9/11.

The internal organization of intelligence community agencies is the basis of failure to adapt to changing counter terrorist requirements. Zegart gives four common findings of failure to adapt. The first was a lack of *corporateness*, or having central command and control of the entire intelligence community. Second, priorities were not set by the agencies or policy makers. Third, there was a lack of a vibrant human intelligence capability and overreliance on electronic intelligence. Her last point is that personnel issues encumbered and stagnated agencies due to civil service rules.[234] Zegart gives an example of private businesses who fail to adapt and often go out of business. New private businesses are organized with internal processes at their inception to address the current external demand. Government agencies are prone to stagnation and failure to adapt due to their eternal nature. Zegart's claim is that government agencies perpetual existence is derived from self-preservation of the agency and political self-interest, which work against executive reforms.

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[231] Zegart, *Spying Blind*, 17.

[232] Ibid.

[233] Ibid., 35.

[234] Zegart, *Spying Blind*, 35–38.

Utilizing academic research, Zegart develops a general model of organizational adaption failure.[235] Her general model of adaptation failure has three central attributes:

> 1. the nature of organizations, which makes internal reform exceedingly difficult; 2. the rational self-interest of political officials, which work against executive branch reform; and 3. the fragmented structure of the federal government, which erects high barriers to legislative reform.[236]

This model is built using a synthesis of two disciplines, organizational theorist and political scientist. Zegart's adaptation failure model explains why government agencies perennially maintain the status quo. This adaptation failure model is well supported anecdotally by examples of failure within established organizational structures of the CIA and FBI. Scenario planning could explore change management through the collaborative nature of the process. Fire Service leaders would have a front row seat for potential push back from the agencies stakeholders. Allowing time for Fire Service stakeholders to evaluate change without commitment could help manage implementation of future missions.

13.   Working Together

Van der Heijden, the aforementioned author of *Scenarios*, writes the forward of Adam Kahane's book on scenario planning. This indicates succession in the futures methodology community of individuals contributing to the discipline.

Van der Heijden begins with a summation for dealing with future uncertainty: "Experience shows that the tool delivers; in most scenario planning exercises, people experience 'aha!' moments about the problematic situation they are facing."[237] A common issue for participants of the scenario planning process is the letdown of returning to business as usual in the current business environment. This is best illustrated by Plato's allegory of the cave; the scenario experience significantly affects the way an individual perceives potential future reality. Kahane contributes to the methodology of

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[235] Ibid., 43.

[236] Ibid.

[237] Adam Kahane, *Working Together to Change the Future: Transformative Scenario Planning* (San Francisco: Berrett-Koehler, 2012), ix.

scenario planning by addressing how to avoid this pit fall. He looks at *transformative* versus *adaptive* responses. Transformative response to scenario planning involves a paradigm shift similar to the metaphor of how a caterpillar transforms into a butterfly.[238]

The scenario building process looks at plausible futures. The focus is on what could happen. This is different from imposing what will or should happen in the future.[239] Transformative scenarios are useful for organizations who find themselves with three characteristic complexities. The current model is: unacceptable, unstable, or unsustainable. The organization cannot transform itself, and the organization is immersed in polarization between parties who cannot tackle the issues head on due to disagreement on what the problem or solution is.[240]

> Any attempt to implement a solution directly would therefore only increase resistance and rigidity. So the transformation must be approached indirectly, through first building shared understandings, relationships, and intentions.[241]

This concept is called *turbulent environment*, which was coined by Fred Emery and Eric Trist in the 1960s. This explains how massive change overwhelmed the coping ability of participants to address the issues at hand.

Kahane outlines the working process for changing mental models through transformative scenario building. First, they transform their understandings. Second, the planners transform their relationships. Third, the planners transform their intentions. Fourth, the planners' shift in perceptions from the first three steps which then allows them to transform their actions in the situation.[242] The mental change process of the planners is described through a review of three part composite social technology theory: a whole-system team of insightful, influential, and interested planners must come together, a strong container or safe environment must exist for the participants to feel free from

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[238] Kahane, *Working Together*, xv.

[239] Ibid., 5.

[240] Ibid., 17.

[241] Ibid.

[242] Kahane, *Working Together*, 38.

repercussions of participation, and lastly the process must follow a rigorous recognized process to produce what could happen plausible futures.[243] Kahane goes at length to differentiate the difference between adaption and transformation. Adaptive scenarios view what is possible and could happen: "Transformative scenario planning assumes that studying the future is insufficient, and so it also uses stories about possible futures to influence what could happen."[244]

The processes of scenario building, Kahane suggests, consist of a five-step method developed over as many chapters: "The five steps are as follows: convening a team from across the whole system; observing what is happening; constructing stories about what could happen; discovering what can and must be done; and acting to transform the system."[245] These steps are similar to other authors in the discipline. The distinction is the notion of creating plausible futures influences could shape the actual outcome. An organization seeking sustainability would find value in the ability to make today's strategic decisions through transformative scenario planning, which supports a continued model of corporate viability for the future.

14.   Collaboration

Collaborate or Perish! is about learning a new organizational mindset in an increasingly highly technologically interconnected world; "we can achieve more together than we can alone."[246] Authors William Bratton and Zachary Tumin state that "despite all the books that have been written about change and leadership, the reality is that most organizations are still locked into the old silo overconfidence: 'We don't need to change really. We'll continue to do more of the same thing.'"[247] Three organizational reasons are given for failure to collaborate. Mind-set 1 is that the concept was "not invented here"; organizations not open to new ideas crush innovation and fail to compete over the long

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[243] Ibid., 20.

[244] Ibid., 21.

[245] Ibid., 22.

[246] William Bratton and Zachary Tumin, *Collaborate or Perish! Reaching Across Boundaries in a Networked World* (New York: Crown Business, 2012), 3.

[247] Bratton and Tumin, *Collaborate or Perish!*, 258.

run.[248] Mind-set 2 is that the plot of "winner takes all" in the internal competition for ideas resulting in companies eating their young, which also can lead to the demise of the organization.[249] The last mind-set, mind-set 3, is an attitude of "we don't do windows here," where failure to remain competitive lies in the organizations' mental model of seeing an emerging opportunity as not their job.[250] Progressive organizations often look for game changing or disruptive innovations by finding ways to repurpose existing capabilities that will offer solutions outside of their normal operations.[251] Collaboration is critical for an organization to remain competitive in a changing environment.[252]

Collaboration is a process tool that highly values gathering multiple stakeholders' input for planning and problem solving. The collaborative process outlined in *Collaborate or Perish!* follows a logical methodology designed for successful collaborative outcomes. Two enemies of collaboration are in disagreement on what to do and how to do something.[253] A blue-sky vision starts out with an organizational vision that there is a better way of doing business going forward.[254] Right-sizing the problem helps to get all the stake holders to agree on going forward with a collaborative process. A consensus must be reached on what the problem of the organization actually is. Right-sizing the problem builds common situational awareness, agreements to share information, and establishes terminology for effective communication of concepts.[255] Making a clearing is the process of establishing an environment for collaboration to occur. This entails establishing an infrastructure that follows a set of rules, and "[creating] a trusted clearing where people can search for, find, and meet like-minded souls, share assets, and collaborate to achieve together what they can't alone."[256] For an

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[248] Ibid., 26.

[249] Ibid.

[250] Ibid.

[251] Bratton and Tumin, *Collaborate or Perish!*, 44.

[252] Ibid., 24.

[253] Ibid., 73.

[254] Ibid., 40.

[255] Bratton and Tumin, *Collaborate or Perish!*, 76.

[256] Ibid., 110

organization, strategic scenario planning creates a highly collaborative environment. Leadership during the collaborative process is crucial in staying above the fray, maintaining vision, remaining optimistic about the outcome, valuing everyone's participation, and managing the field of play for the active participants.[257] It is important for organizations to realize that traditional business as usual models become increasingly scrutinized in a world that is highly interconnected.[258]

The hierarchical structure of the Fire Service historically used a top-down management. The concept of collaboration and embracing a bottom-up strategy for idea generation could be leveraged by scenario planning. Scenario planning is dependent upon collaboration between divisions within an agency. Trial and error during the adoption of a collaborative culture comes at low risk. Scenario planning allows for discarding or narrowing of ideas.

This chapter began with the concept that all people have different levels and style of creativity. Creative diversity values the input of everyone. Crafting how ideas are offered nudges people in an effort to make better decisions for their own sake. The organic evolution of the human mind is adapted for survival in the wild and can lead to automatic decision making without the mental effort of spending time purposefully thinking about solutions. Taking the long view, there is a need to think and plan for the future. There is the recognition that well-intentioned successful companies have failed by not planning to remain competitive in a changing environment; this has been termed the innovators dilemma. There are established underlying schools of thought and actions in the strategy formation process. Scenario planning is offered as a way to change how we think, creating new mental models. Scenario planning can be used to increase flexibility and capacity for strategic planning. The process of scenario development leads to strategic conversations about how to deal with uncertainty in a changing environment.

The strategy paradox recognizes that following only one strategy or model can be either very successful or catastrophic for an organizations' future. Transformative

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[257] Ibid., 252.

[258] Ibid., 311.

scenario planning recognizes the likelihood that an organization will have an aha! moment during the scenario building process. Finding a paradigm changing solution to remain competitive versus staying with a sustainable model increases the long-term viability of the organization. Creative innovation concerns taking a new paradigm into commercialization for continued long term sustainment of an organization. *Spying Blind* recognized that existing organizational internal construction will face challenges in shifting missions. Collaboration places the talents of an organization's people within an organized process to develop creative ideas and solutions. Combining all of these elements is an integral part of scenario planning. Scenario planning produces strategic conversations that allow organizational leaders to make better decisions today that could have significant outcomes in the long-term sustainability of the organization tomorrow.

B.   CONCLUSION

Business sectors use established business theories to compete in their sectors. The Fire Service could replicate already established business theories. Futures methodology uses a collaborative process that capitalizes on individual and group creativity. Futures methodology has the ability to address complex environments with an uncertain future. Traditional business methods of forecasting and projection have limitations that futures methodology does not. The Fire Service likely uses forecasting and projection as a method's to develop five-year budgets, fire apparatus replacement cycles, and five- to 10-year strategic plans at the local level. Futures methodology scenario planning is a process tool that develops plausible future scenarios. The goal of futures methodology scenario planning is to take an "imaginative leap into the future."[259] Industry decision makers can use plausible future scenarios to think through potential issues prior to their occurrence. The goal of futures methodology is to help decision makers make better decisions now, which will affect the business's relevance in its sector in the future.

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[259] Peter Schwartz., *The Art of the Long View: Planning for the Future in an Uncertain*, 1st. ed. (New York, NY: Doubleday/Currency, 1991), xiii.

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IV. RESEARCH DESIGN

The research question is this: How can scenario planning shape the delivery of the Fire Service in the next 20 to 30 years?

Scenario planning starts with the establishment of a collaborative group of representative division heads and decision makers in a given organization. To develop a specific business model in any given sector, a representative group of division heads within a business is assembled to collaboratively establish drivers that have potential future effects on their industry.[260] This group of subject-matter experts systematically researches drivers. These drivers are issues that could be expected to affect the future of a business sector. Then weights of the drivers are varied to produce differentiated plausible future scenarios. The goal of creating plausible future scenarios is for a group to change their current mental models and begin strategic conversations on how to maintain relevance and sustainability of their organization into the future.

Complexity and uncertainty is addressed by the collaborative group by asking big, "what if?" type questions. "What if?" certain weighted combinations of these drivers were to actually occur and how would it affect their organization? Academic research has shown that organizations that prepare for plausible future outcomes are able to maintain relevance, sustainability, and leadership in their business sector. Strategically, enterprises are more likely to weather a future disruption by establishing adaptive cultures for alternative futures while still addressing the needs of today.[261]

A thesis by nature is an individual effort. The limitation of a thesis is that the normal futures methodology utilizes a highly collaborative approach. A normal futures methodology team would include a diverse group whose different perspectives and creativity could produce a larger pool of thoughts on how to embrace this scenario.

This thesis relied on the group efforts of other sources such as FEMA's SFI for emergency managers, and self-identified emerging issues from fire chief conferences.

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[260] Schwartz, *The Art of the Long View*, 248.

[261] Raynor, *The Strategy Paradox*.

The author, as a 25-year member of the Fire Service, utilized his professional perspectives as a Fire Service leader to vet the drivers' usefulness for his specific industry sector. The drivers were grossly weighted by the author's professional estimation in order to develop plausible scenarios that display paradigm shifts of the Fire Service. The narrative style scenario as an end product of futures methodology is a task that can be accomplished by an individual using established collaborative research.

The drivers identified in this thesis are categorized as determinants, variables, and trends. A determinate is a foundational element that is not likely to change or would change very slowly over time. Removing fire from the Fire Service, removes the need for a Fire Service. Variables are like the metaphor of a political election, a basic plot of winners or losers. The variables chosen could go one direction or the other, with no middle ground as a compromise. A survey of emerging trends self-identified during fire chief conferences held during 2012 was used to establish variables. Trends are the early indication of a potential for a paradigm shift. An increase of 125 million more citizens in the U.S. by 2050 would have a profound effect on the Fire Service. The FEMA SFI driver papers for emergency managers were also used to establish trends expected to affect the Fire Service. This paper relied upon drivers developed by collaborative efforts related to the future of the Fire Service. The drivers include "U.S. demographic shifts, universal access to and use of information, critical infrastructure, government budgets, technological development and dependency, changing role of the individual, climate evolving terrorist threat, and global interdependencies."[262] These determinants, variables, and trends are most likely to affect Fire Service delivery models in the future.

The determinants, variables, and trends were then used to develop three narrative scenarios that illustrate plausible future outcomes for the Fire Service.[263] After examination by the author, three main themes were drawn from these drivers. There are

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[262] "U.S. Demographic Shifts," FEMA, May 2011, http://www.fema.gov/media-library/assets/documents/27086?id=6022.

[263] There are risk management software analysis tools that can produce more precise combinations when a collaborative group seeks to create a greater number of weighted combinations. For the purposes of introducing an academic futures methodology scenario planning as a process tool, the scenarios have enough differentiation.

drivers that affect fire problems, people problems, and advanced technology that are dependent on budgeting. The author then weighted a scenario that removes people problems to see what the Fire Service could develop as a response to this paradigm shift. A second scenario increases the weight of the people problem as an opposite direction, specifically to create a wide contrast in possible paradigm shifts in the Fire Service. The last scenario is weighted to allow budgets to support a dramatic increase in information technology in order to explore implementation of advanced situational awareness during emergency operations. Different plausible future scenarios are intended to provoke strategic conversations about the future of the Fire Service.

Three plausible narrative scenarios were developed:

- "The Centurions" illustrates increased out-of-hospital medical care delivered by the Fire Service.

- "No Code Response" focuses on smart building technology and the Fire Service moving away from providing emergency medical care.

- "Get the Red Out!" provides an example of increased interoperability between agencies in a highly technological environment.

The intent of these narratives is to provoke strategic conversations in a non-confrontational manner, thereby allowing stakeholders to consider plausible different futures. The suggested potential strategies are a few examples based upon the author's experience.

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V.   DETERMINANTS, VARIABLES, AND TRENDS

The paradox of innovation is that it is accepted as an innovation when it has become imitation.

—Piero Scaruffi,
software consultant

A.   DETERMINANTS

Determinants are stable factors that are expected to change little over a course of time. Two determinants are used for this thesis, natural and man-made fire, and death and morbidity. These determinants are core missions of the Fire Service: to save lives and protect property. Weighting the determinants allows differentiation during the construction of a plausible scenario. Both determinants are present in all scenarios.

1.   Natural and Man-Made Fire

The U.S. Fire Administration (USFA) was created in 1971 with a mission to coordinate at the national level and "foster a solid foundation for our fire and emergency services stakeholders in prevention, preparedness, and response."[264] For the purposes of this paper, natural and man-made fire is a determinate underlying the futures methodology scenario planning. According to the U.S. Fire Administration, approximately 3,400 citizens die each year as a direct result of fire.[265] Approximately 17,500 people are injured each year as a direct result of fire, and the property loss annually reaches 12 billion dollars.[266] Fighting fires result in an average of 100 firefighter deaths each year.[267] The United States has one of the highest per-capita fire losses in the world of industrialized nations.[268] This is even after a steep decline in fire

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[264] "About the U.S. Fire Administration," U.S. Fire Administration, accessed January 21, 2014, http://www.usfa.fema.gov/about/.

[265] "About the U.S. Fire Administration."

[266] Ibid

[267] Ibid.

[268] FEMA, *FEMA Fire Death Rate Trends: An International Perspective*, Topical Fire Report Series 12, no. 8 (July 2011), https://www.usfa.fema.gov/downloads/pdf/statistics/v12i8.pdf.

fatalities in the last 40 years.[269] The two broad concepts of fire as a determinate are man-made and naturally occurring fires.

The use of fire as a weapon by the Greeks and Romans is well documented. Robert A. Baird points out that "pyro-terrorism possesses the four generally accepted elements of terrorism: targeting of noncombatants, political motivation, violence with a psychological impact, and organized perpetrators."[270] The events surrounding 9/11 involve Al Qaeda's (AQ) use of fire as a weapon. AQ's intent for the Twin Trade Tower attack was a terror-inciting plan for unconstrained violence and destruction by using aircraft as unconventional weapons. This relied upon the catalyst release of stored energy (fuel) in a destructive way, thereby collapsing both towers.[271] The heat released by the burning fuel caused the intense fires. Those fires caused the underlying metal framework of the buildings to fail, resulting in the collapse.[272] The media coverage and public outrage made AQ a household name almost overnight. AQ was successful in using fire as a weapon/terrorism in its quest to gain attention for their political causes; 343 firefighters died as a direct result while conducting firefighting operations on 9/11 in New York City.[273]

In 2013, several incidents were reported where fire was used as a weapon. A Florida man set fire to his apartment at the outset of a killing rage that ended six people's lives.[274] A student at the University of Central Florida planned to use the fire alarm pull

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[269] "About the U.S. Fire Administration."

[270] Robert A. Baird, *Pyro-Terrorism—the Threat of Arson Induced Forest Fires as a Future Terrorist Weapon Of Mass Destruction* (Quantico, VA: United States Marine Corps, School of Advanced Warfighting, 2005), 5.

[271] Baird, *Pyro-Terrorism*, 5.

[272] Ibid.

[273] "9/11 Memorial Pages," FDNY, accessed January 21, 2014, http://www.nyc.gov/html/fdny/html/memorial/index.shtml.

[274] Fire Department New York, "Gunman Sets Apartment Fire to Initiate Killing Spree," Watchline, August 1, 2013.

panel to evacuate school dorm residents prior to a failed shooting spree.[275] A New York gunman started a fire at his residence prior to killing four and wounding two.[276]

Man-made fires encompass more than just arson and terrorism. At some point in human evolution, man created fire.[277] Fire's use has grown into many types of intentional heat sources for home, office, and transportation (internal combustion engines). Sources of ignition can also be a by-product of other manmade processes supporting habitation, business, and transportation. The USFA reports the main leading causes of death by fire in residential buildings between the years of 2007–2011 as other unintentional, careless, cause under investigation, smoking, electrical malfunction, and intentional.[278] The leading causes of residential building fires between the years of 2007–2011 listed by the USFA are cooking, heating, electrical malfunction, other unintentional, careless, intentional, and open flame.[279] Man in the post-industrial age will continue to seek a form of fire for cooking, heating, and transportation, and, therefore, man-made fire will continue as an underlying determinate for fire protection.

Naturally occurring fire is a factor in establishing fire as a determinate. Vaisala, a global leader in environmental and industrial measurement, estimates an average of 22,849,146 cloud-to-ground lightning strikes per year in the 48 states, between the years of 1997–2012.[280] The National Fire Protection Association (NFPA) compiled a report based on estimates from USFA, National Fire Incident Reporting System NFIRS, and an NFPA fire experience survey. The NFPA estimated a total of 22,600 fires were started by

[275] Fire Department New York, Center for Terrorism and Domestic Preparedness, "Student Planned to Pull Fire Alarm before Shooting Spree," Watchline, March 21, 2013.

[276] Fire Department New York, Center for Terrorism and Domestic Preparedness, Watchline, March 14, 2013.

[277] Sindya N. Bhandoo, "Humans' First Use of Fire May Not Be So Long Ago," *New York Times*, March 14, 2011, http://www.nytimes.com/2011/03/15/science/15obfire.html?_r=0.

[278] "Residential and Nonresidential Building Fire Estimates," U.S. Fire Administration, accessed January 21, 2014, http://www.usfa.fema.gov/statistics/estimates/index.shtm.

[279] Ibid.

[280] "Number of Cloud-to-Ground Flashes by State from 1997 to 2012," Vaisala Inc., accessed January 21, 2014, http://www.lightningsafety.noaa.gov/stats/97-12Flash_DensitybyState.pdf.

lightning causing 451 million dollars in damage.[281] The intensity of lightning strikes is a major factor in wildland fires; the average lightning fire burns more acres as compared to fires started by humans.[282] The National Interagency Fire Center is the nation's leading support center for wildland fires.[283] Based upon the meteorological phenomenon of lightning, the occurrence of fire due to lightning strikes is likely to remain a constant.

2. Death and Morbidity

The primary mission of the Fire Service is to save lives and protect property. During 2012–2013, there were 240 million calls made to a 911 center in the United States.[284] There is a basic need for out-of-hospital health care, and the Fire Service provides emergency medical services. Terminology for basic statistics regarding public health include incidence, prevalence, morbidity, and mortality. Incidence is the probability of a person contracting a disease over time. Prevalence determines a person's likelihood of contracting a disease.[285] Morbidity means illness; one individual can have multiple co-morbidities.[286] Mortality means death.[287] There is a strong justification for out-of-hospital medical care due to a statistical demand, to which the Fire Service has the capability to provide pre-hospital medical care.

The Fire Service as a culture is sensitive to tragedies striking children and young adults. Adolescents account for 64 million people in the United States, between the ages

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[281] "Number of Cloud-to-Ground Flashes by State from 1997 to 2012." "Lightning is also a major factor in wildland fires, and the average number of acres burned per fire is much higher in lightning fires than in fires caused by humans."

[282] Ibid.

[283] "Welcome to the Nation's Logistical Support Center," National Interagency Fire Center (NIFC), accessed January 21, 2014, http://www.nifc.gov/.

[284] "911 Statistics," National Emergency Number Association, accessed January 21, 2014, https://www.nena.org/?page=911Statistics.

[285] "911 Statistics."

[286] Ibid.

[287] Ibid.

of 10 to 24.[288] The causes of mortality include unintentional injuries (48 percent), homicide (13 percent), and suicide (11 percent). Of the unintentional injuries, the major causes of death are vehicular injuries, poisoning, drowning, and discharge of firearms.[289] The very nature of these mortalities occurs outside of a hospital, and the resulting unintentional injuries provoke a response from 911 fire and emergency services. For the purposes of establishing death and morbidity as a determinate, adolescents will be used as the representative group.

B.   VARIABLES

If at first the idea is not absurd, then there will be no hope for it.

—Albert Einstein

Variables are factors that could move in one direction or another. They are changes that can follow a win or lose plot with a limited resource. A political election may be in doubt, but what is not in doubt is that only one person will win. The following variables have strong ties to political consequences and could rise or fall correspondingly. The selection of these variables is due to their direct impact on the Fire Service. These variables were a common trend during 2012 conferences held by fire chiefs at state, national, and international forums.[290]

1.   Merging of Agencies and Homogenized Training

Budget pressures allowed smaller fire departments to explore consolidation of administration, education, and training with other agencies.[291] This kind of consolidation occurs when an individual agency gives up its autonomy, primarily driven by budget,

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[288]Robert William Blum and Farah Qureshi, "Morbidity and Mortality among Adolescents and Young Adults in the United States AstraZeneca Fact Sheet 2011," Johns Hopkins Bloomberg School of Public Health, 2011, http://www.jhsph.edu/research/centers-and-institutes/center-for-adolescent-health/az/_images/US%20Fact%20Sheet_FINAL.pdf.

[289] Ibid.

[290]"Global Fire Service Leadership Summit—Education and Development," IAFC, accessed December 7, 2012, http://www.iafc.org/Education/content.cfm?ItemNumber=4928; Gary, Fire Service Emerging Trends; "The future of the Fire Service," thecompanyofficer.com, accessed September 1, 2013, http://thecompanyofficer.com/2011/02/08/the-future-of-the-fire-service/.

[291] Gary, *Fire Service Emerging Trends*.

political, and public pressures. Consolidating administrative functions of fire departments that individually have less than five fire stations into one large administrative fire agency is more cost effective than sustaining the administration of multiple smaller fire departments.[292] When merging of agencies occurs, homogenization of training standards follows. This continued trend would be healthier for the Fire Service while a reversal of this trend could result in increased cost to the taxpayer and decreased interoperability of fire units within geographic areas.

Fire 2.0 is emerging as a way to consolidate agencies and homogenize training.[293] Fire 2.0 calls for training and operational standards to be established in large, target-hazard specific geographic areas to increase interoperability of participating fire agencies. This increases capability while reducing costs.

2. Threat of Privatization

The threat of privatization comes from private agencies capable of providing service at reduced cost. Increased use of private resources would be detrimental by resulting in the decline of public resources. The level of service does not necessarily have to be equal, just a less expensive option for taxpayers. The changes caused by the shutting down of fire stations and/or a reduction in personnel has had a trickle down affect impacting emergency medical services. Changes at the federal level in health care restructuring also will affect service delivery.[294] During this period of economic downturn, private sector competition is increasing as fire departments nationwide deal with legacy benefits.[295] The impact of privatization will vary with public trust and continued budget pressure. The threat of privatization could vary widely with support from politicians seeking to reduce budgets without raising taxes.

These variables have a common thread in the demand for increased capability in the presence of fiscal restraint. How these variables are addressed in the future falls

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[292] Ibid.

[293] Ibid.

[294] Ibid

[295] Ibid.

within a win-or-lose plot model with limited resources affecting political influence on the governance of the Fire Service.

C. TRENDS

> *Governments will always play a huge part in solving big problems. They set public policy and are uniquely able to provide the resources to make sure solutions reach everyone who needs them. They also fund basic research, which is a crucial component of the innovation that improves life for everyone.*
>
> —Bill Gates

Trends are the early indication of a potential for a paradigm shift. The Department of Homeland Security's FEMA agency has developed an open website, which supports the SFI.[296] From the SFI main web page, the stated goal of the SFI is to assist emergency managers in taking *a long view* on emergency management.

> The world is changing in ways that can have major effects on the emergency management community. Thinking more broadly and over a longer timeframe will help us understand these changes and their potential impacts. FEMA launched the Strategic Foresight Initiative (SFI) to promote broader and longer term thinking on those changes and their effects.[297]

For the purpose of this thesis, the trends identified by FEMA will be used as driving trends for scenario building. These trends have a potential long-term impact at a strategic level and may not be on the daily radar of Fire Service operations. The purpose of identifying these driving trends is to enhance the situational awareness for the Fire Service at large. The following paragraphs provide a summary on the SFI driver papers located in the research section of the SFI website.[298]

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[296] FEMA, "Strategic Foresight Initiative," accessed May 29, 2013, http://www.fema.gov/strategic-planning-analysis-spa-division/strategic-foresight-initiative.

[297] Ibid.

[298] The FEMA SFI website contains additional information and links that further develop emergency management process tools for Fire Service leaders seeking situational awareness of emerging driving trends that have a continued trickle-down effect on delivery of the service at all levels of the Fire Service.

1. U.S. Demographic Shifts

There are five trends of U.S. demographic shifts that have implications for the Fire Service.[299] A primary mission of the Fire Service is to save lives and protect property. The first impact to service demand will be a 42 percent growth in population between the years 2010–2050. This will increase the U.S. population by 130 million people, and 82 percent of this growth will be through immigrants and their descendants. The current generation of Baby Boomers entering into retirement age will almost double the current senior population percentage rate of 12 percent to 21 percent of the general population. The percentage of racial and ethnic populations will continue to increase. There is a rise in megaregions and urban sprawl. Coastal counties will continue to grow, increasing population density and producing economic growth for those areas. The shift toward megaregions and coastal communities will have corresponding declines for communities in the interior of the country.

These trends will challenge the Fire Service through rise in demand along the coasts with corresponding falling demand for service of the interior regions of the country. The changes in population growth and rise in percentage of the elderly will potentially impact the need for increased capacity for emergency medical services. Immigrants may not seek assistance in times medical need or disasters for fear of deportation. Greater urban sprawl and increasing population density will challenge the Fire Service with changing demands to the traditional NFPA 1710/1720 geographical deployment model of service. Increasing cultural diversity may also affect language and culture barriers.

2. Universal Access to and Use of Information

Trends identified by the SFI are Internet access expansion, consumers producing and consuming information content, spontaneous reporting, crowdsourcing, and Fire/ EMS use of the Internet and social media to communicate with their citizenry.[300] The

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[299] "U.S. Demographic Shifts."

[300] FEMA, *Universal Access to and Use of Information*, July 11, 2012, http://www.fema.gov/media-library/assets/documents/27114?id=6030.

expansion of the Internet is expected to increase to 2.6 billion subscriptions by 2015. Wi-Fi available to the public is projected to increase to over 1 million by 2015. Mobile devices are expected to be the primary Internet connection device of over 1 billion users by 2020. The rise in two-way communication for subscribers enables them to produce content is now affecting how people consume the Internet. The effect of mobile devices has changed the news media with the emergence of spontaneous reporting of events in real time. Increased informational awareness utilizing software currently deployed to evaluate crowdsourcing capitalizes on the emergence of a big database of consumer's behavior captured in the moment is projected to increase. Fire/EMS will increase capability for two-way communications with the citizens they seek to serve. During an emergency, the resources needed by resilient citizens will increase with the emergency management deployment of social media developed to provide for information to promote the common good.

Emergency management is experiencing the growth of "anywhere, anytime, and on any device" production of information.[301] The paradigm shift in how content is produced is currently shifting to capitalize on an Internet-connected citizenry. Spontaneous crowdsourcing has tremendous implications for emergency managers seeking to provide public service. The disruptive element with nefarious individuals reporting disinformation for their personal reasons to the detriment of the greater public can also occur.

The interconnection to other SFI drivers include "the changing role of the individual, critical infrastructure, evolving terrorist threat, and technology development and dependency."[302]

3.   Critical Infrastructure

Over the next several decades, infrastructure is likely to change. The major trends include the aggressiveness, which construction and improvements occurs, the responsibility for infrastructure (public versus private), the infrastructure remains

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[301]FEMA, *Universal Access*, 3.

[302] Ibid., 4.

nationally centralized or move toward regionalization, the increase in the computerization (SCADA) of physical infrastructure, and the government's responsibility for securing infrastructure.[303] Declining infrastructure could compound natural or man-made disasters.

The currently aging infrastructure will be prone to increased failures. The cost to maintain and repair infrastructure is rising. Private sector enterprises may begin to fund infrastructure in order to increase logistics. In recent years, the federal government has maintained responsibility to secure information and communications as a national strategic infrastructure that most other sectors are increasing reliance upon. Increased computerization embedded with physical infrastructure opens up the possibility of cyber-attacks. Cyberspace has become an important national security mission.

Decentralization of infrastructure will challenge management to efficiently provide smaller capacity of electricity and water on a regional basis. The government could see an increased role for the private sector to provide protection of communications and information systems. Individual resiliency could face challenges with over dependence on information technologies. Resurgence in funding infrastructure could increase resiliency on a regional and local level through independence from centralized utilities.

4. Government Budgets

The 2007–2008 financial crisis has brought tremendous budget pressure to the local Fire Service.[304] Closing fire stations and/or the elimination of positions has been a mechanism to contain Fire Service annual budgets.[305] During the financial crisis, the Fire Service, at the state and local level, has been under pressure, which often resulted in

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[303] FEMA, *Critical Infrastructure*, June 11, 2012, http://www.fema.gov/media-library/assets/documents/27083?id=6021.

[304] "Global Fire Service Leadership Summit–Education and Development."

[305] Gary, *Fire Service Emerging Trends*.

decreased service.[306] Local and state Fire Service budgets are tied to shorter economic cycles and can fair better or worse during any given upturn or downturn of the economy.

The public's perception has recently changed from a positive view of the Fire Service to a negative one, because it is believed that the Fire Service receives more in personnel benefits than their Fire Service is worth.[307] Public opinion can affect politicians elected to govern. The poor public perception is occurring during a period of mission expansion in the Fire Service to encompass All Hazards in support of the national domestic preparedness standards.[308]

In the post-2007-2008 financial crisis, governments linked through global inter-dependency could see slow gains in the economy for a prolonged period of time. With mounting debt, the federal government will have to decrease spending or raise taxes. This issue exists at the state and local level as well. Medical and pension fund asset losses will also drive deficits.[309] Emergency managers at all levels of government face spending cuts and tax increases to avoid high debt accumulation. These budget pressures have resulted in reduction of emergency management programs. These budget pressures might result in less resilience of citizens during disasters with fewer resources to share.

5.   Technological Development and Dependency

Mobile devices are becoming the choice for Internet and communication. The risk and opportunities with "The Internet of Things"[310] are associated with individual remote access that can control, locate, and monitor technological devices. Electronic patient health records and telemedicine could change the current delivery of treatment and patient care. Biotechnology may positively change health care for an increasing population of elderly. The current advances in medicine may increase lifespan and

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[306] Jeffrey M. Wallin, "Identifying Staffing Model Options for the Moorhead Fire Department," 3.

[307] "Global Fire Service Leadership Summit–Education and Development."

[308] Clovis Jr., "Promises Unfulfilled," 1.

[309] Ibid., 2.

[310] The Internet of Things refers to the growing network of Internet-accessible devices and their ability to exchange data. "Technological Development and Dependency," FEMA, June 11, 2012. http://www.fema.gov/media-library/assets/documents/27108?id=6028.

productivity while postponing or decreasing the normal cost associated with an aging population.

Emergency managers will have greater electronic access through mobile devices. This may increase expectations from the public on the level of service they will come to expect. Examples of citizens directly involved in the production of information have been documented with emergent Google maps produced by consumers during an emergency.[311] The risks involved with consumers producing content lies in false reporting and wasted resources provided to non-existent conditions.

6. Changing Role of the Individual

They role of the individual is changing. Current trends include social interaction and relationships are being built online, society as a whole is increasing mobile, amateurs are becoming trusted content producers of information, and the public's trust in the U.S. government is decreasing. Social networks are replacing a centralized government as trusted sources of information.[312]

All age groups are increasingly using advanced technology as a means to socialize. This has increased geographic boundaries for groups and increased selective interaction within group structures. While building homogeneity within a group increases acceptance of individuals, this also decreases tolerance for other social groups that no longer have forced social interactions in a traditional geographically restricted community. Emergency managers using a top down management approach through a hierarchy of social institutions may now have to integrate virtual communities into the exchange of information during critical incidents.[313]

The mobility of society is increasing as transportation and communication technology became more available. Telecommunication and cloud-based computer

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[311] "Governmental Budgets," FEMA, June 12, 2012, http://www.fema.gov/media-library/assets/documents/27094?id=6025.

[312] FEMA, *Changing Role of the Individual*, June 8, 2012,1, http://www.fema.gov/media-library/assets/documents/27063?id=6017.

[313] FEMA, *Changing Role of the Individual*, 1.

systems no longer require strict geographical presence in a workforce for many industries. The mobility of society has a disadvantage on intimate knowledge of their immediate surroundings. During an emergency, individual's dependency on mobile technology could fail leaving the individual with have no idea on how to self-evacuate from a disaster area.[314]

Past assumptions about how the government built trust with its citizens included the thought that governmental experts collectively possessed information and knowledge not accessible to the general public. The rise of amateurs through online interaction in virtual communities has decreased dependency on government agencies for expert information. This challenges government agencies on how to pass information to the public during emergencies. There is a continuing shift by the general public with social networks comprised of peers. Trust in government institutions is decreasing.[315]

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[314] Ibid.

[315] Ibid., 4.

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VI.   SCENARIO 1: THE CENTURIONS

Our wretched species is so made that those who walk on the well-trodden path always throw stones at those who are showing a new road.

—Voltaire

The year is 2035. The Lake Shore Fire Department serves a large metropolitan population of 750,000 citizens, with the county population approaching 3.4 million citizens. Today is any given day in the lives of the personnel who serve with Lake Shore Fire Department. This day, while often appearing chaotic to someone outside of emergency services, gives the reader a glimpse of the lives of their public servants.

The front of Lake Shore Fire Station 27 looks like a two-story commercial office building. There is ample parking with a circular driveway. Gleaming ambulances outnumber the fire engines parked inside open garage bay doors. Fire Station 27 responds to fire calls as well as requests for out-of-hospital definitive medical care. The station includes a basic public health clinic, which operates from 0800–1700 hours, Monday through Friday, and a 1000–2000-hour clinic schedule on the weekends. The Fire Service out-of-hospital definitive care and public health clinic had evolved from the need to decrease the cost of medical care and increase medical access for the citizenry.

The Affordable Care Act of 2010 has evolved into a nationalized system of community-based paramedics, known as independent duty medics (IDMs). State and federal legislators also increased the scope of medical practice for physician assistants (PAs) and registered nurses (RNs) to better serve the public health care needs of a rapidly growing nation. The out-of-hospital model of health care delivery is partially based upon the U.S. military medical community, which provides out-of-hospital medical care to more than 3.2 million active and reserve service members.

The out-of-hospital culture created by public health doctors relies upon implementing "the most conservative care." If an IDM has a question regarding the direction of patient care, the IDM would refer the patient to the RN, the next-highest level of medical care. This results in quickly bumping patients up the hierarchy of

medical personnel as needed until the patient reaches the definitive level of medical care to match his or her needs. The highest level of medical provider in a typical large metropolitan fire department or regional fire authority is a chief medical officer (CMO), a medical doctor (MD). There is a continual stream of communication up and down this hierarchy of medical personnel, creating a deep sense of public trust.

The CMO in a larger fire department or combined fire authority typically supervises a clinical staff of 10 PAs (physician's assistants), 50 RNs (registered nurses), and 40 IDMs (independent duty medics). Fire chiefs of these systems typically supervise 100 firefighter IDMs. To streamline costs and administration, groups of up to 50 fire stations have been organized by local government leaders into one large fire department, or regional fire authority. Collectively, the CMO/Fire Chief executive teams have become known as the "Centurions," due to the nationally standardized span of control of 100 IDMs per executive officer of a regional fire authority.

In the 2010s, the Fire Service competed against the private sector to keep EMS in the Fire Service.[316] It had been a bitter struggle, pitting the private sector against elected officials and government leaders. In the end, the public had determined the outcome. Sworn members of the Fire Service were viewed by the general citizenry as deserving greater trust in caring for their medical needs. The Fire Service at large had seen a 30 percent increase of membership, plus an additional gain of 70 percent of medical clinical personnel.

It is a beautiful day in June as we look into the lives of the members of the Lake Shore Fire Department.

Fire Chief Bradley Stone is sitting at his desk reviewing the day's agenda for the senior staff meeting. He hears a familiar *thud, thud, thud* come from the wall directly behind his desk, the familiar inside-to-outside code from his Chief Medical Officer Brian Shore, which meant, "Are you ready?" Chief Stone swatted the wall with a *thud, thud*, replying, "Of course!" Dr. Shore would be in his office within the next few minutes and join him in the morning hologram briefing for oncoming chief officers. Universal access

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[316] Variable 4 Threat from Privatization Low.

to and use of information had steadily increased in capability for the Fire Service.[317] The purpose of this morning ritual at 0730 hours was for each division chief and battalion chief to give their top three priorities of the day, which helped to provide situational awareness on issues common to all and allowed them to collaborate on individual issues that affected only a few. Dr. Shore would conduct his daily brief, "sick call in 60 seconds." Dr. Shore's daily brief included outbreaks, clusters, and routine medical issues, and then Chief Stone would conclude with the around-the-world-in-60-seconds brief that consisted of political, administrative, operational, and intelligence concerns. Technological development and dependency[318] has increased situational awareness that allows leadership to view how global macro issues can affect local micro issues. The main points of the briefs would be posted online by 0800 hours for the fire crews at the station level to review during their morning meetings.

Dr. Shore was a creature of habit. He began preparing his morning brief as soon as he woke up each morning. As an early-riser, his day had started at 0430 hours with a half-hour jog around the neighborhood, giving him time to think about what his top priorities would be for the day. Doc knew that his top priorities would still be subject to the disruptive nature of 911 emergency calls. Daily plans were always subject to immediate change. Lagging the East Coast by three hours, it benefited Dr. Shore to get news that flowed in from Europe and the major hubs of medical information based on the Eastern seaboard.

By 0500 hours, Dr. Shore logs into his secure medical provider account, views posts from the *Public Health Watch* (PHWs) daily digest, and skims several blog subscriptions that provide him with the latest trends in pre-hospital medicine. The major focus of his profession is the responsibility of a community-based paramedic public health care system. The pre-hospital medical care system relied upon a large workforce of Fire Service IDMs who could provide definitive patient-care outside of the hospital. U.S.

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[317] Trend 2 Universal Access to and use of Information Medium.

[318] Trend 5 Technological Development and Dependency High.

demographic shifts had caused a paradigm shift in the delivery of public health care for the Fire Service.[319]

Dr. Shore follows trends for public health providers, which encompass diseases with the potential for the greatest national impact on the population. These trends include major health issues like cardiovascular disease and transitory hazards such as viruses and contagious diseases. The framework of public health Dr. Shore subscribes to includes long-term monitoring of programs for overall improved health, and reductions in injuries, disability, and disease. He also monitors the current capability and capacity of his region's health care system, which could support a spike in demand from a transitory issue like a flu pandemic. Knowing the reserve capacity in the hospital systems enables Dr. Shore to implement strategic plans for core medical services in the event of a catastrophe.

Constrained government budgets had historically impacted CMOs like Dr. Shore in their ability to meet the demand for universal access to out-of-hospital medical services.[320] In theory, public health care was universally available; however, there was the ongoing challenge of having enough available resources for the public to access the health care system. It never ceased to amaze Dr. Shore that people with serious medical problems would wait until the last minute to access health care. Many times in the case of dread disease, the access occurred too late in the pre-hospital system for effective interventions.

The Lakeshore Fire Department now has two major branches of service, fire operations and medical services. The department has two chief executive officers, the Fire Chief and Dr. Shore, the chief medical officer. These two officers were equal in rank. The chain of command placed operational fire officers with authority over medical corps officers. This was similar to the line officer and non-line officer model reflected in military chains of command. The Fire Service followed this model of accountability while implementing the incident command system (ICS). All operational fire officers are eligible and expected to take incident command based upon seniority. All medical

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[319] Trend 1 U.S. Demographic Shifts High.

[320] Trend 4 Government Budgets Low.

officers are expected to provide direct support of fire operations. Physician's assistants, nurses, and independent duty medics are assigned to a division or group in support of emergency operations by a fire officer with authority in the incident command system. Although a PA outranks a fire captain, the PA is subject to the direction of the incident command system often initiated by a fire captain serving in the role of the incident commander.

Homogenized training steadily increased with out-of-hospital demand for medical services.[321] The clear definition of operational roles has forced the two branches of the Fire Service to consistently develop a homogenized training plan. Having a homogenized training plan allows both branches familiarity of the roles and responsibilities of each other. Dr. Shore played a key role in developing a homogenized training plan and the strategic guidance on the implementation of a plan that provided total unit cohesion.

Dr. Shore joined the Fire Service through a government outreach program that sought to have individuals commit to a period of public service for the greater good. The changing role of the individual resulted in increased participation in government service. The medical branch within the Fire Service as a whole has a much higher turnover rate than fire operations. The average time spent in public service for the medical corps was three–five years in any one position. Medical personnel valued the Fire Service as an alternative to military service or other public agency. The Fire Service could not keep parity with the private sector in salaries and compensation. Declining budgets are a perennial issue for governments trying to balance changes in the economy, resulting in lagging salaries and compensation in the public sector.[322] The value of public service was highly valued by the medical community and considered almost mandatory for those seeking upper-level leadership roles. Dr. Shore had risen to the highest position within an individual fire service agency.

One of Dr. Shore's best "go to" guys in fire operations is Bobby Archer, or call sign "BA" to his friends. Battalion Chief Robert Archer is usually concerned about three

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[321] Variable 3 Homogenized Training Medium.

[322] Variable 1 Declining Budgets Medium.

things: training, training, and more training. The Fire Service has a large role in out-of-hospital health care within its vibrant mission to save lives and property from man-made and natural disasters. As a national asset, the Fire Service is now a primary detector in the strategic defense against chemical, biological, radiological, nuclear defense, and explosives (CBRNE) threats. The Fire Service also monitored and inspected sections of critical infrastructure. Critical Infrastructure Protection (CIP) has increased by decreasing risk through smart technologies. Natural and man-made fires have decreased in direct proportion to critical infrastructure increases. Chief Archer is responsible for implementing tactical training on a daily basis that keeps all personnel on track to support the larger strategic mission of national security.

Battalion Chief Archer, like Dr. Shore, has a primary counterpart to support his daily objectives. The administration and paperwork flows smoothly with his partner, PA Jeff Donald and his MD support staff.[323] The perennial issues for both men are the continual professional development of their crews. Homogenous legislation at the national level dictates training requirements, continuing medical education, state firefighting certification requirements, and national CBRNE qualification requirements. It seemed to Battalion Chief Archer that, by the time he got a member of his battalion fully qualified, they were promoted, and they immediately inherited a completely new set of training requirements. Then there were the probationary firefighters coming and going passing through his battalion like it was a rotating door. The nonstop march of personnel and training requirements created a challenging working environment. To address this challenge, Battalion Chief Archer's favorite expression became, "Every morning, I get a bowl of spaghetti and a pair of chop sticks; my job is to make straight lines!"

It was a source of pride that Archer felt his promotion to battalion chief was based upon his problem-solving skills. It was the Fire Service after all. By definition, the Fire Service was based upon solving other people's problems. Fire Service culture was built around "serving others before yourself." This internal trait allowed the Fire Service to remain compassionate while delivering service during challenging working conditions.

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[323] Determinant 2 Natural and Man-made Fire Low.

The public's support of the Fire Service was largely due to the recognition that the Fire Service was not trying to exploit the public, in contrast to the perceptions that private medical service enterprises were trying to make a buck off of every little thing.[324] That had become the bane of the private sector and general backlash at consumerism.[325] Taking care of his firefighters was job number one for Battalion Chief Archer. They put their hands on the patient and put the wet stuff on the red stuff at a fire. Battalion Chief Archer's firefighters were the end point of service by physically caring for a patient or handling a fire hose to put out a fire. Battalion Chief Archer taught his firefighters to value customer service. Often the first contact a citizen had with their local government an encounter with a firefighter during a crisis. The Fire Service saw this as an opportunity to make a lasting positive impression on the citizenry with a commitment to put the best interests of the citizenry first. Service before self remains a key precept of a public servant.

While Dr. Shore and Battalion Chief Archer watch over the big picture, individual fire stations have lives of their own. The mom and pop operations, as they are affectionately known as, are a reference to who had control inside the firehouse (docs) and who had control outside the firehouse (firefighters). The firefighters all knew to respect the house rules of the clinical divisions (CDs). The CDs knew that fire operations had their backs in the heat of battle during large man-made or natural disasters. The fire operation personnel's expectation was to make sure everyone got back to the firehouse safe and sound. Merging of these two branches of emergency management had challenged Fire Service leadership to manage change, while providing continuity of service.[326] The division of labor had taken a while to evolve, but everything seemed to work pretty well with the arrangement, with the occasional glitch here and there.

Captain Jay Markham had the responsibility of Station 27, an individual firehouse, or mom and pop operation. Captain Markham's role is the delivery point of the department's service strategy. He is directly responsible for the boots-on-the-ground

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[324] Variable 1 Declining Budgets Medium.

[325] Variable 4 Threat from Privatization Low.

[326] Variable 2 Merging of Agencies Medium.

implementation of policy, training, and education. RN Cathy Creamer, Captain Markham's MD partner, sat next to him as he began conducting the 0800 morning meeting. "All right, quiet down and listen up!," Captain Markham said as he started the meeting. Captain Markham proceeded through the daily laundry list of information and updates. All of the information was already posted in the online situation room, but the meeting gave him time to answer questions and check on the health and welfare of his crews. Electronics just could not tell him how a crewmember felt today.[327] The Fire Service's strongest asset is its personnel. Management considered the most valuable renewable resources the time and money invested into professionally developing their personnel. Even medical personnel rotating out into the private sector would take with them the strong commitment to public service.

"Battalion Chief Archer says the mayor will be out at Fire Station 17 today," continued Markham. "The mayor will be with the local councilman regarding Engine 17's off-duty volunteer time to rehab the local kids' playground. Dr. Shore says they got a cluster flu going on in New York from a virus coming out of Europe. The flu is expected to be in the region within the next week or so, an expected seasonal flu pattern.[328] The battalion chiefs are worried about the new radiation-detection software rollout for cell phones, the next physical fitness test for duty this quarter. Seems like they put four firefighters into straight day assignments last quarter for test failure. And last, but not least, we're lagging on state fire incident management team re-qualifications.[329] Doc Cathy, what do you have?"

RN Cathy Creamer, the mom to Captain Markham's pop, loved working in the Fire Service. Her husband was nagging her to take a better paying position at the hospital, as he was worried about qualifying for a larger house for their growing family. Cathy would sorely miss this place. Cathy now started her part of the 0800 morning brief alongside Captain Markham: "Well, IDMs Joe Blanc and Sam Stinson are already taking our first 0800 appointments, accessing their electronic patient records, and starting vitals.

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[327] Trend 5 Technological Development and Dependency High.

[328] Trend 1 U.S. Demographic Shifts High.

[329] Variable 2 Merging of Agencies Medium.

We are fully booked today, that plus any walk-ins. I'll need the fire engine IDMs to pick up the overflow—I'll page you when we need you. It's Taco Tuesday, so you know what's for dinner. Lunch is S&S. Here's the grocery list: Who's shopping?"

Groans were heard, soup and salad again for lunch. The plan was designed for a busy lunch schedule, and ended with a better dinner option. No one dared to try to stare Doc Cathy down.

Captain Markham gets his first call of the day, a medical aid at 0855 hours. He steps up onto Fire Engine 27 and quickly checks the call details on his mobile command module. Engineer Mitchell Nichols looks across at him, and Nichols can tell from the green indicator panel lights that his crew is belted in and all electronic systems are ready.

The integration of the medical equipment and supplies into a seamless transmission of streaming data has cut down medical transports dramatically. Still, his three-two deployment model of having three fire personnel on the fire engine while two of his fire IDMs drive the ambulance is considered "the most conservative care." The tradeoff is that on a fire call, he deploys with a full fire attack crew of five.

As engineer, Nichols checks the response route suggested by the Fire Communications Center (FCC), he saw a "yellow leg"[330] on the run. Captain Markham had already picked up on it. "FCC detects Public Works servicing a stretch of blacktop that is having stripes and lines being painted on it today," said Captain Markham. Engineer Nichols nods as he asks about the patient's history, anticipating equipment needs. Captain Markham's IDMs are already searching for information about the medical call from their auxiliary command modules. Over their headphones, they hear a crew member say, "Looks like Mrs. Creighton was expecting a baby, but not this soon."

When they arrive, Captain Markham knocks on the door as he sets one of the med bags down near the door and turns to retrieve another. Mrs. Creighton answers the door, looking distraught. "Hello, I'm Captain Markham, how can we be of service to you today?" he asks. "The baby's coming!" she replies. "Well, let's take a look," Captain Markham says. As Mrs. Creighton sat down on the sofa, the crew of five flew into a well-

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[330] On Google maps, red indicates stopped traffic, and yellow signifies slow traffic.

established routine. Beverly Matthews, one of his fire IDMs, is opening up a patient assessment pack (PAP). The PAP is a single-patient-use wireless telemetry package consisting of a standard configuration for vital signs, EKG, and respiratory self-adhesive sensors. The sensors create electronic tones, or music, and, work together to set the mood for the crew. An IDM could quickly tell whether the medical call was going to be a happy (good outcome) or a sad song (poor outcome). Some of the negative trending electronic melodies put the crew into a full hustle. While other electronic tones allowed the crew to relax and enjoy a slow dance, building trust with the citizen by allowing time for a more personalized interactive experience.

Frank Davis, another one of Captain Markham's fire IDMs, applies the cardiac sensors. Joe Springer, the newest member on the crew as a fire IDM, attaches the OB addendum sensor kit. IDM Doc Beverly applies the respiratory sensors, looking at O2, CO, and CO2 saturation levels.

Engineer Nichols is rounding out the band, getting the portable medical monitors synched to the electronic patient record (EPR) system. Doc Beverly rolls the sonography wand, doing a quick check and verifying the steady fetal heart tones and physical movement. After a series of standard IDM questions following the OB protocol, Doc Beverly announces to Mrs. Creighton that everything looks fine.

"But I'm having terrible contractions!" Mrs. Creighton replied.

Doc Beverly asked, "Have you ever heard of Braxton-Hicks contractions?"

"No, I don't think so," Mrs. Creighton replied.

"Well, it is also called false labor. It's your body getting ready or practicing for when you go into your real delivery," Doc Beverly replied. Captain Markham had Mrs. Creighton's obstetrician, Dr. Walsh, available to take a consult.

"Mrs. Creighton, I have your doctor on the telescreen," Captain Markham said as he turned the FCU around for Mrs. Creighton.

"Hello there Betsy, how are you doing today?" Dr. Walsh asked.

"Well, now I'm a little embarrassed by all the attention, but I thought I was going into labor," Mrs. Creighton replied.

"No, you're fine from what I can see of the baby's activities on my screen. I see you were due to come in Friday morning. Why don't you go ahead and come in this afternoon around 3:00 PM. Are you driving or driverless?" asked Dr. Walsh.

"Oh, I'm driverless," replied Mrs. Creighton.

"Well, then I don't have to worry about you trying to hold onto the steering wheel while having another Braxton-Hicks contraction on your way to the clinic. Keep the fire OB sensors on till then. Just synch the telemetry to my office through your phone. I'll have the nurse call you once we start receiving your telemetry. Sound good to you?"

"Yes, that's fine. I'll feel better about coming to see you. No offense to you firefighters," said Mrs. Creighton.

"None taken Madam, we just want to see you taken care of," replied Captain Markham. Part of Captain Markham's crew was removing sensors off of Mrs. Creighton and leaving OB sensor instructions. The other members of his crew were packing up their equipment, resetting and reloading for the next call. The last thing Captain Markham had to do was take a quick peek that the auto-supply request for this call had been sent to the medical support system. "Done!" he thought as he walked out the door, waving goodbye to Mrs. Creighton who was already talking to an OB nurse and rubbing the abdominal fetal heart rate sensor on her still exposed belly.

Back at the station, IDM Sam Stinson was handling an emergency walk-in. Little Bobby had taken a fall while playing during his third-grade class recess out on the playground. Bobby's mom, Sue, was concerned that his arm might be broken. Sue produced an unlock code for Bobby's EPR. Stinson quickly glanced at it: not much history and all vaccinations seemed up to date. As Sam applied the PAP, it occurred to him how much pain the boy must be going through. While many childhood spills and falls were minor, there were still plenty of plastic casts to be signed in grade school. Sam gently felt the skin directly above where Bobby pointed at hurting the worst. The area directly above Bobby's injury just felt too warm. Sam punched in a request for RN Cathy Creamer to take a quick ultrasound check. Doc Cathy's diagnosis confirmed a radial bone fracture.

"Well, Sue, looks like Bobby really did break his arm today," she said. "I'm checking appointments now at the orthopedic center down off of Magnolia Avenue. Is that going to be close enough for you?"

"Yes, that is right by my house. Am I'm going to go there right now?" Sue asked.

"No, we'll give Bobby some pain medication to ease his anxiety and let our PA Jeff McDonald verify the medical orders. It'll take a little while; we're pretty busy this morning. My IDM Sam will splint and sling Bobby's arm. That will also make Bobby more comfortable. Why don't you head home from here and wait for the patient confirmation notice to be delivered. Just keep an eye on your phone. I expect that Bobby will be seen within the next couple of hours."

At headquarters, Dr. Shore wasn't having a positive outcome with his current medical outcome. He was in a deep consult with PA Jeff Donald, from Fire Station 10, and patient Rodriguez's oncologist Dr. Richardson. Captain Markham's crew is now at Mr. Rodriguez's home where he is receiving home care treatment for his intestinal cancer. The home health nurse called in 911 upon her arrival this morning. Having undergone surgery six months ago, Mr. Rodriguez was on his second round of chemotherapy. The advanced medical directive for Mr. Rodriguez expressed a desire to pass away at home. Dr. Shore had been requested for the consult because this event was way past the fire crew and battalion PA-level of definitive care. Dr. Richardson's concern was that options were running out for Mr. Rodriguez. It was time to transfer him to Hospice Home Care (HHC). This was the third time in the last 10 days that Captain Markham's crew had been to the Rodriguez residence. The conclusion of the consult was that all parties were watching the patient's demise in an electronic sad song. This would be the last time the fire crew encountered Mr. Rodriquez.

Dr. Richardson would run another analysis on Mr. Rodriguez to confirm his diagnosis of terminal cancer. From there, the hospice home health center would be called to set up an appointment today and start palliative care, provide support for the family, and set up a schedule for family/caregiver updates twice a day until his demise. As Mr. Rodriguez health declines, the frequency of updates would increase and as much information as possible would be provided to the families. HHC informally recognized

that these were two patient cases: the patient and the family. An embedded element of HHC was the mental health care management team who could attenuate level of support to the family as needed. Very few families would want a family member to pass away at a hospital. The culture of American society had shifted back toward the expectation that one was supposed to die at home. Hospital deaths were the result of trauma, surgical complications, and critical medical patients not responsive to out-of-hospital standards of care. The case of Mr. Rodriguez was not unusual. The normal process would have been for his oncologist Dr. Richardson to have placed him into HHC without the Fire Service participating in the medical intervention. Dr. Shore handled 3–4 of these type consults a week on a normal basis. The end result would be to take Mr. Richardson off of the 911 system for emergency response. A 911 call regarding his condition would now be transferred to HHC for definitive care.

At the end of this day, Dr. Shore reflects that the safety net for public health care at the Lake Shore Fire Department is working well. The brick and mortar clinics of the Fire Service allow more access to the citizens. Chief Stone's firefighter IDMs take care of citizens wherever needed. The two branches, fire operations and medical services are integrated and performing at a very high level. Dr. Shore's vision of the Fire Service is fulfilled. The personnel of the Lake Shore Fire Department are dedicated public servants, who are deeply trusted by their citizens.

A. DRIVERS THAT SHAPED THE CENTURIONS

The weighting of this scenario uses three of the 10 drivers to force the scenario in a defined direction. This scenario should not be viewed singularly, but in contrast with all three scenarios together. The determinate driver of death and morbidity was weighted as high to explore a dramatic increase in the role the Fire Service could play in the future of public health care. The variable driver of the threat from privatization was weighted low to allow the scenario to be driven by an increase in the public service role of the Fire Service. The trend driver of U.S. demographic shifts was weighted as high to explore how a dramatic increase of population could drive demand for the Fire Service to provide more medical care. This combination of driver was chosen to create a plausible narrative that would not follow the

normative of projecting/forecasting more of the current delivery of Fire Service. Table 1 shows the drivers that shape The Centurions.

Table 1.   The Centurions Drivers.

THE CENTURIONS	SCENARIO 1
Determinants	**Weight**
Death and Morbidity	High
Natural and Man-made Fire	Low
Variables	**Weight**
Merging of Agencies and Homogenized Training	Medium
Threat from Privatization	Low
Trends	**Weight**
U.S. Demographic Shifts	High
Universal Access to and Use of Information	Medium
Critical Infrastructure	Medium
Government Budgets	Medium
Technological Development and Dependency	Medium

1.   Potential Strategies for Addressing the Scenario

Fire Service leaders who see this plausible scenario as a desirable future would have to adopt a strategic plan that calls for increased capacity to provide medical care through the Fire Service. Tactically, several elements would have to be developed to support this strategy. The capacity of Fire Service personnel would have to grow in size and the workforce would have to increase its scope of medical practice. The infrastructure capacity specific to the delivery of medical care would have to increase. This infrastructure would not only include fixed facilities but also rolling hardware and

medical equipment. The capacity for IT infrastructure of the Fire Service would have to expand to address a high degree of mobile information flow such as voice, data, video, and telemetry. The Fire Service would have to redefine how it sees the composition of "who" is a member of the Fire Service. This would require the integration at the most basic level of team members who do not fight fires but have critical job skills necessary for the overall mission of the Fire Service.

To anticipate this plausible future, Fire Service leaders would need to begin posturing now for a much larger workforce of mixed disciplines. Fire Service leaders who see this as a negative plausible future should posture for the specialization of rescue tactics within the Fire Service that are not dependent upon medical care. Fire Service leaders who take no action on this plausible future could struggle with the decline of the Fire Service if the private sector out competes them for budget resources. These three thoughts are the beginning of "what if" conversations to embrace, reject, or ignore in this plausible future scenario for the Fire Service. If conversations are started about the strategic future posture of the Fire Service due to this scenario, then futures methodology has produced a successful outcome.

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VII.   SCENARIO 2: NO CODE RESPONSE

An idea that is not dangerous is unworthy of being called an idea at all.

—Oscar Wilde

It's a hot July day in 2034. Joe Pease drives into the parking lot of the Lakeshore Fire Department. The Fire Department occupies a commercial structure with a large business office in the front of the building. The back of the building consists of open bays with large roll-up doors for the city's fire apparatus.

Pease, a local builder, has an appointment with Captain Jay Markham to review building plans and receive the Knox code for his planned fire protection system. Critical infrastructure protection has become a major focus of the Fire Service.[331] As Joe Pease enters the front office, he meets with a receptionist who directs him down to window number 11. The office is a large, open space with 35 uniformed firefighters working at their workstations. Their responsibilities include enforcing fire building codes, conducting inspections, and running the Knox Fire Control Center to verify extinguishment of uncontrolled fires. Natural and man-made fire has dramatically decreased with better critical infrastructure protection through smart technology in the construction sector.[332] The threat from privatization of services has dramatically affected the basic mission of the Fire Service, resulting in the elimination of pre-hospital emergency medical care.[333] When the Knox Center cannot control a fire start with the building's fire protection systems, the office empties out onto the apparatus floor and rolls out as a task force to the fire call.

It is rare to get an uncontrolled fire nowadays, and Joe is not too worried about having his appointment interrupted. The approval stamp from the Fire Department is extremely expensive for builders trying to cut corners on a building's fire protection

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[331] Trend 3 Critical Infrastructure High.

[332] Determinate 2 Natural and Man-made High.

[333] Variable 4 Threat from Privatization High.

system. Declining budgets have already resulted in the generation of alternative revenue sources.[334] While uncontrolled fires are rare, they put fear in the minds of owners of commercial and residential buildings. The protection of the buildings is their responsibility, and as such, property owners not only face the loss of the property with an uncontrolled fire, but also the loss of the building itself. Additionally, the market is small for low-tech buildings, which usually cannot be insured. This shift represents the changing role of the individual and an expectation that each citizen exhibit more self-reliance and resiliency.

When Pease meets with Captain Markham, he is polite and courteous. Markham performs a double identity check on Pease, one biometric and an ID card, before issuing him a Knox software key for his planned building project. The Knox company had been acquired by Google in 2017 as a side corporation to market Tier 1 smart building technology. The name was retained in honor of the company's roots in the highly regulated building security access industry. In the 2010s, they were still using metal keys. Universal access to and use of information has not benefited the Fire Service with decreased budgets and loss of missions.[335] Now the Fire Department has taken over the buildings' fire protection systems with the Knox electronic software keys. Everyone else would have called it a software code, but the Fire Department's tradition of maintaining metal keys had become the naming convention for the industry.

The paperwork for the permitting was in order for Pease, and the electronic funds had cleared. Markham issued him an encrypted coin to unlock the Knox fire protection software once his technicians were ready to "go live" with the building. Markham reminded Pease that, once the code activated, it would automatically send Pease an inspection request for the final electronic sign-off of his building permit. The certification of occupancy would not be issued until this final step in the process took place. In all likelihood, Pease's project would be completed as planned. With rotating personnel serving the citizens, Captain Markham was not apt to have further contact with Pease, so he wished him well.

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[334] Variable 1 Declining Budgets High.

[335] Trend 2 Universal Access to and Use of Information Low.

Markham sat back down at this desk to check his email inbox. Earlier, he had seen an email regarding the death notice of a retired fire captain from his department. He barely remembered the guy, but he became nostalgic when he saw that the captain had been a paramedic. Government budgets continued a downward spiral where more was expected for less, resulting in decreased capabilities in the Fire Service due to higher costs.[336]

Captain Markham started his career as a fire paramedic. Currently, Markham's only medical training was at the American Red Cross First Aid level. The Fire Service at large had not been able to compete with the private sector EMS and lost out on its role in EMS. As a result, there was not a single ambulance in his Lakeshore Fire Department.[337] With the rise of smart building technology from the 2010s, Markham decided to continue his college education in building engineering. His hunch had been right. The side money in building systems for the construction industry had worked well all along the way, which was beneficial after the pension collapse of 2020. Thankfully, Markham did not have many years in the old pension system and easily converted over to the new first-responder system.

The UL/NIST studies of the 2010s had caused a paradigm shift for the Fire Service. The call for homogenized training evaporated overnight,[338] and the merging of agencies also fell out of favor.[339] Historically, the Fire Service was to arrive at the scene of a fire and have the capability to rescue trapped fire victims. That had worked out with legacy building construction of the 1970s and earlier. The lightweight building construction of the 1980s through 2010 had become more economical, but at the cost of exponential fire growth. The UL/NIST fire studies had first proved cities needed four-person minimum staffing. OSHA had backed that requirement up with a two-in, two-out policy on personnel entry to immediately dangerous life hazard (IDLH) fire conditions. This required that two firefighters going into a fire and having a backup of two

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[336] Trend 4 Government Budgets High.

[337] Trend 4 Government Budgets High.

[338] Variable 3 Homogenized Training Low.

[339] Variable 2 Merging of Agencies Low.

firefighters outside to rescue them, thereby increasing fire safety. This drove up the cost of providing Fire Service. Adding to the potential cost was the UL/NIST fire studies of the 2010s. The UL/NIST studies had concluded that modern lightweight building constructions had potential for exponential fire growth. Economical structures required faster response times to rescue occupants trapped in a fire.

At first, the Fire Service had lobbied their politicians for additional fire companies and personnel, hammering away at public and firefighter safety. The public at large, through social media, became informed that its fire agencies could not rescue trapped occupants unless they lived near a fire station. Years of expensive technological development and dependency were proving that the Fire Service that would not be there to save you in time.[340] The economy was just beginning to recover by the late 2010s. There was a large political backlash over the suggestion to build more fire stations and hire even more firefighters because citizens were unwilling to take a reduction in additional public services or a raise in taxes in order to extend the Fire Service. The citizens expected the Fire Service to save them at a fire. The UL/NIST studies had the unintended consequence proving that many citizens could not have that expectation. The unfunded pension and health benefits from the 1990s and 2000s also contributed to the demise of the Fire Service. The rate of U.S. demographic shifts did not occur fast enough to generate enough revenue to sustain an outdated model of public service.[341]

At that point, the construction industry, hailed as the "last product completely made in America," introduced a novel solution. The industry could put more people to work, creating more jobs for a homegrown industry by building smarter buildings.[342] Fire-resistant technology and residential sprinkler systems had been around all along. The premise of the model had been that it was more profitable to pay for Fire Service than increase the cost of building. The tipping point hit when the decreasing cost of fire protection systems became significantly cheaper than maintaining a standing fire department. Lakeshore had lost 75 percent of their workforce. The increase in private

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[340] Trend 5 Technological Development and Dependency Low.

[341] Trend 1 U.S. Demographic Shifts Low.

[342] Trend 1 U.S. Demographic Shifts Low.

sector jobs in the building industry was hailed by the president of the United States as a way to continue driving economic recovery. The labor unions' influence was lost within a year or two of losing 75 percent of their member's union due to contributions to the union political war chest.

The positive backside for pension-management fund managers was with the large transition of new to mid-career employees moving into the private-sector EMS industry, they could offer three options. Option one was to take the member contributions and roll them over to the EMS private corporations 401k plans. Option two allowed for members with more than 10 years of service to delay receiving retirement checks until they turned 55 years old. Option three was a direct payout with associated tax penalties. The majority of the transitioning workforce chose to roll over their contributions over to their new employers. The dramatic result for pension fund managers was to go from underfunded pension plan projections to well-funded pension fund projections.

The widely implemented 2010 Affordable Care Act, now called "Hillary Health," had made universal access to health care at a national standard. Death and morbidity decreased as a direct benefit.[343] The ACA increased the scope of medical practice for physician assistants, nurses, and paramedics to provide pre, post, and definitive patient care. The combined effect of easing the unfunded pension/health care systems had been universally embraced by everyone except the immediately affected firefighters. The grassroots cry became, "Are you serving us, or are we serving you?"

The new pension plan for first responders is based upon overall contributions. Instead of years using the formula of qualifying service multiplied by a percentage of salary, the plan now calculated accrued service units (ASUs). The ASU was purchased at the current open market rate, and the investment strategy was highly regulated by state and federal authorities. The value of the ASU was also affected by the fund manager's investment strategy, which meant that higher employee contributions were matched by employers. Individual members could determine what portion of the maximum contribution they wanted to commit to.

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[343] Determinant 1 Death and Morbidity Low.

Captain Markham, for example, had worked a second job to maximize his gain by making full contributions to his individual retirement account. However, not everyone contributed the same way. Getting promoted allowed Captain Markham to make higher contributions due to the salary increase. There was no longer a formula for a high-year salary that lacked career-long contributions. This was but one factor that had affected the unfunded pension liability of the 2000s. Most Fire Service members were accepting of the new formulas, which allowed them to roll over all of their contributions upon retirement into a private account. The back end for the employees was in creating transferable wealth and willing remaining funds to their heirs.

Captain Markham had worked feverishly to increase his education and computer skill set. The drawdown in the workforce had not occurred by seniority. The city fathers had taken the opportunity to set new job requirements and physical fitness standards. A minimum of a four-year college degree within a selected group of disciplines was now required. A nationally standardized candidate physical ability test (CPAT) was now required for all new hires. A similar department-wide physical fitness test was conducted bi-annually. If someone failed twice without having a job qualifying injury, he or she was discharged from service for failure to perform firefighter duties. Similar to the military, the Fire Service had become a young man's game. It was not uncommon to see firefighter's transition out to another career field in their 40s. Lakeshore fire department had conducted interviews and performance-based tests over a three-year phase in. Lakeshore only selected the top 25 percent of each rank for retention in their fire department. This pattern was almost universally adopted with a few holdouts in very wealthy cities.

Captain Markham found the new higher standards to his personal likings. His schedule was two days at the eight-hour desk. The next two eight-hour workdays he spent in the field conducting inspections and service to Knox systems. The last eight-hour day was dedicated training for his battalion to stay sharp on fire response, NIMS, and components of CBRNE. Then he took two days off from work. He remembered fire

crews being stationed at separate fire stations in his battalion,[344] but, with the drawdown, his entire fire department was now under one roof. After 1700 hours of every shift, they were on their own time for personal projects unless they received a fire call.[345]

While Captain Markham was at work in the office, the back of the office held the fixed Incident Command Post. When a fire call came in, those on rotational duty, in two-hour increments, would go to the command post and interact with the boards or electronic display panels. The firefighters could take over a building's Knox Fire Protection System, which included the buildings built in public address system. With smart sensing technology, the sensors could tell the difference between a common unattended food fire on a stove and a fire starting anywhere else in a building. The citizens in the building would receive instructions for self-help on their mobile electronic platforms. If it was just a matter of turning off the stove, the Fire Department could electronically open the unit's door for a neighbor and shut off the stove. K-12 education now emphasized citizen resilience and the duty to act for the community. Arson and fire as a weapon incidents were still occurring, although it relatively rare. Off-duty personnel could be called back to the fire station to respond as a surge capacity workforce utilizing the fleet of reserve fire apparatus kept in the fire station.

Captain Markham had been part of the transition to the new Fire Service. The accreditation process was used as a risk based/risk informed methodology to calculate probabilities of fire (needs) balanced against resources available (money). The accreditation method incorporated big data, GIS mapping technology, and CAD data. A determination had to be made for each city as to what level of service does a city require versus how much could the citizens afford. The state Fire Service maintained the computing and database capability to create a cafeteria menu style of options in a neutral manner to civic leaders. Better, smarter buildings created equity for all consumers. The bigger the building, the more the fire protection would cost. This system of the Fire Service matching resources with demands hit the country about the same time many

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[344] Variable 2 Merging of Agencies Low.

[345] Determinate 2 Natural and Manmade High.

others economic sectors were facing similar budgetary reductions. Smaller was better. Smaller was cheaper.

A. DRIVERS THAT SHAPED NO CODE RESPONSE

The weighting of this scenario uses three of the 10 drivers to force the scenario in a defined direction. This scenario should not be viewed singularly but in contrast among all three scenarios together. The determinate driver of death and morbidity was weighted as low to explore a dramatic decline in the role the Fire Service would play as a fallen emergency management sector leader. The variable driver of the threat from privatization was weighted high to allow the scenario to be driven by a decrease in the public service role of the Fire Service. The trend driver of government budgets was weighted as high to explore how competition from the private sector could drive the Fire Service out of a leadership role in the delivery of out-of-hospital medical care. This combination of drivers has been chosen to create a plausible narrative that would not follow the normative of projecting/forecasting more of the current delivery of Fire Service.

1. Potential Strategies for Addressing the Scenario

The suggested potential strategies are a few examples based upon the author's experience and own ideas. This scenario is meant to spark discussions among a variety of participants to deliberate potential futures and many other courses of actions that could/ should be taken now to address them. Table 2 shows the drivers that shaped the No Code Response scenario.

Table 2.   The No Code Response Drivers.

NO CODE RESPONSE	SCENARIO 2
Determinants	**Weight**
Death and Morbidity	Low
Natural and Man-made Fire	High
Variables	**Weight**
Merging of Agencies and Homogenized Training	Low
Threat from Privatization	High
Trends	**Weight**
U.S. Demographic Shifts	Low
Universal Access to and Use of Information	Low
Critical Infrastructure	Low
Government Budgets	High
Technological Development and Dependency	Low

Fire Service leaders who see this plausible scenario as a non-desirable future would have to adopt a strategic plan that calls for increased competition with the private enterprise medical care business sector. Tactically, several elements would have to be developed to support this strategy. The workforce of the Fire Service would need to embrace a culture of adaptability that would allow Fire Service leaders to embrace emerging mission opportunities. The current tension between elected officials, labor, and Fire Service management would need to decrease to enable dialog over emerging mission opportunities in the Fire Service. The workforce of the Fire Service would have to compete against the private sector. The pay and compensation of the Fire Service would

need to develop new models that provide security for their members while providing budgetary sustainability for the citizens that they serve. The Fire Service would need to look at alternative deployment models of the Fire Service to address the exponential fire growth potential of modern building construction.

To anticipate this plausible future, Fire Service leaders need to begin posturing now for increased competition pressures from private enterprise. Fire Service leaders who see this as a negative plausible future should posture to develop a sustainable business model for the Fire Service that out competes the private sector. Fire Service leaders who see this as a positive future should posture to separate out the emergency medical mission from the Fire Service and begin the process of becoming building engineer specialist. Fire Service leaders who take no action on this plausible future could struggle with forced changes to the mission of the Fire Service that are dictated by government officials and demanded by the private sector. These thoughts are the beginning of "what if" conversations to embrace, reject, or ignore this plausible future scenario for the Fire Service. If conversations start due to this scenario about the strategic future posture of the Fire Service, then futures methodology has produced a successful outcome.

VIII.   SCENARIO 3: GET THE RED OUT!

The vast majority of human beings dislike and even actually dread all notions with which they are not familiar .... Hence it comes about that at their first appearance innovators have generally been persecuted and always derided as fools and madmen.

—Aldous Huxley,
English novelist

Captain Jay Markham is on his usual morning commute, about halfway to his fire station, looking forward to seeing what the latest intelligence was in his metro Zone 3. Technological development and dependency have changed how individuals maintain knowledge over global information.[346] NOAA weather reports have been going off almost every half hour with the red flag weather alerts for his 24-hour shift. His oversized cell phone wristwatch is synched to his car's electronic display console. Universal access to and use of information has brought a paradigm shift in the interconnectedness of how the Fire Service is able to communicate across a wide variety of IT platforms.[347] The audible alerts would interrupt the digital radio as text to voice with his online avatar's voice. As a registered member of the Fire Department, Captain Markham also would get an alert for any medical aide or incident within his general proximity as part of a network of off duty firefighter's willing to give initial reports, intelligence, and start emergency management for incoming Fire Service units. The steady stream of lights, beeps, and vibrations alerting Captain Markham of in-coming communications were just part of everyday life.

The commute to work is uneventful this morning. Markham recognizes his "C" division counterpart's vehicle in the parking lot. Captain Markham went to the academy with Steve Wilson. Captain Wilson was one of his favorite online collaborators as a

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[346] Trend 5 Technological Development and Dependency High.

[347] Trend 2 Universal Access to and Use of Information High.

partner "in the rear with the gear" on active incidents.[348] In fact, Markham might need Wilson's help sometime today.

Captain Markham walks into the apparatus bay floor and electronically unlocks his floor locker with his watch. Inside, his locker had an additional smaller storage area with a second locking mechanism, a fingerprint scan. In his secondary locker, an additional security measure keeps control of his two most important pieces of department issued safety gear: his guardian gauntlet and heads-up display eye protection (eye pro). He takes his guardian gauntlet off charge and slides it onto his forearm, snapping it into place. Next, Captain Markham puts on his eye pro and immediately checks the battery status. It would take several seconds for his electronic personal protection (EPP) to synchronize with the fire station's red wireless network, more commonly known as the rednet.[349] Changes in the economy have reversed declining budgets and benefited the Fire Service with access to state of the art technology.[350]

The guardian gauntlet has a glossy, laminated woven fiber, plastic composite appearance. The style of the device is reminiscent of a swordsman's leather gauntlets worn to protect the forearm and wrist. The size allows for increased battery life, increased radio signal, and more processing power than a traditional cell phone. The surface of the guardian gauntlet was only a skin for the exoskeleton of the wrist bracer. The skin was a photovoltaic augment of the internal power supply and was easily replaced if damaged. The merging of agencies consolidated the main functions of the guardian gauntlet: CBRNE detection, biometric identification and vital sign indicator, auto-personnel locator (APL), and NOAA micro collecting sensor.[351]

This capability functioned seamlessly with the internal wireless communication capabilities. The cell phone capability was for longer distance transmission of data, while the red-tooth function was for short-distance information transfer to the next nearest Fire

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[348] Variable 2 Merging of Agencies High.

[349] Rednet is a wireless network with data encryption to defend against cyberattacks during an emergency.

[350] Variable 1 Declining Budgets High.

[351] Variable 2 Merging of Agencies High.

Service hopscotch-relay platform. The rednet and red tooth wireless technology was specifically developed for emergency management. The private sector had proved susceptible to cyber-attacks, due to their focus on profits over security. This had ended the threat of privatization of the Fire Service.[352] There were multiple verifications of user identity, including biometric verification and a geo-location initiation at an authorized access point. This had been in response to the rise of cyber-attacks 20 years earlier. The eye pro heads up display integrated with the arm bracer. The eye pro had no need of internal processing capability; it merely relayed information from the wrist guard. The eye pro component allowed for quick visual reference and situational awareness of pre-set alerts or constant monitoring preferences. A significant capability of the eye pro was the ability to see through smoke. In heavy smoke conditions or hours of darkness, the heads up display component could show Global Information Systems (GIS) topographic displays and NOAA information. The guardian gauntlet was the collaborative integrative device for NOAA/NICS/GIS real-time data feeds. Inter-agency Homogenized Training had built trust and operational efficiency between Fire Service stakeholders to better serve the citizens. The interoperability of platforms is now standardized to support a firefighters' need for fuel, weather, and topography affecting assigned fire protection zones.[353] The high security requirements of these two EPPs requires a triple lock: the fire station security, outside locker, and inside locker. Criminal and domestic terrorism requires defense for unauthorized users.

Captain Markham gets into his uniform and meets Captain Wilson at the dining table in the bullpen. Daily shift turnover briefs had become formal, reflecting the early days of the fire crew's line-up on the apparatus floor in the Fire Service. Transfer of equipment and post shift de-briefings still only took a few minutes.

"What ya got for me today?" Markham asked Wilson.

Wilson proceeded to turnover through electronic signatures the high-value equipment assigned to the station and fire apparatus. Radio frequency identification

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[352] Variable 4 Threat from Privatization Medium.

[353] Variable 3 Homogenized Training High.

devices (RFID) now came embedded as a standard in manufacturing for high value items. The programmable functions of RFID allowed for easy tracking and transfer of equipment, with big database recordings of historical confirmations of inventories. Some RFID were even capable of melting to disable a critical component of a device lost or stolen with a command prompt from the fire communications center.

Captain Wilson relayed the normal checklist of medical aides and false alarms. He did have an interesting call involving a driverless supply vehicle that had blown two tires on the right side, pulling it mechanically out of the electronic street sensor path. The vehicle had shut down and stopped traffic flow in the driverless vehicle lane, snarling traffic temporarily until the tow truck arrived. The elephant in the room with both captains was the building red weather pattern and projected extreme fire danger reports from NOAA.

Captain Wilson remarked, "I wish I were you today!" as he chuckled on his way out of the bullpen, calling over his shoulder, "Maybe I'll be your online wingman today."

Captain Markham had a wide grin on his face as he went out onto the apparatus floor. He checked with his engineer, Mitchell Nichols on the condition of Engine 12, their assigned fire apparatus. The fire apparatus had devolved some electronic capability while evolving mechanically reliable new technology. The basic power train and fire pump were now mostly pull-push, turn, and twist configurations to keep it electronically as simple as possible.

Earlier generations of fire engines had become so electronically dependent that they had become unreliable under fire conditions. Because of this, the Fire Service had fallen victim to cyber hackers a generation ago who, for their own reasons, had spoofed fire apparatus electronics, debilitating fire engines on critical responses. The current electronic capability was a pod or skid load "hopscotch" component mounted on top of the apparatus. This hopscotch component managed near and far data feeds. Any personnel with a red tooth device were monitored by the hopscotch, and their information was pushed to the National Incident Command System (NICS) live database. Incident commanders (ICs) could get projected fire weather/behavior situational awareness (SA)

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in a matter of minutes instead of hours once assigned to an incident. Natural and man-made fire continues to be a central Department of Homeland Security priority, due to the large loss of life and property.[354]

The hopscotch was an integral part of a self-healing network for communications of many datasets. The original self-healing networks now included the rednet/red tooth technology. The crews could be remotely monitored for biometrics. The battalion chief at an incident could survey the crews to see how they were holding up during their shift. Parameters were set to send off alerts if any crew member was experiencing either decreased O_2 saturation, measurable CO levels, body temperature, or heart rate increases as early warning signs of over exposure to the environment.

The CBRNE detection, NOAA, and APL data was also pushed to NICS from the hopscotch. The fire engine can maintain near-distance sensing recording and push it out later when atmospheric conditions prevent communication with the NICS rednet hub. The NICS system constantly monitored individual fire resources pushing updates from the boots on the ground and provides wide situational awareness for the IC. Important situational awareness was gated down to engine level to prevent overwhelming data dumps on the operational end users. The integral big data analysis of NICS is intended to provide the earliest indication of small problems that could get big in a hurry. U.S. demographic shifts have shaped mega cities with concentrated population density.[355] This had resulted in small critical incidents now having a higher impact on the citizenry.

Small fires become large fires. Captain Markham was endlessly going through his mental checklist of things he needed to do to be prepared to keep a small fire start from becoming a large fire. Upon reaching the garage, Captain Markham asked engineer Nichols how the rig was running today.

"Strong and steady as an ox. She just got a preventive maintenance on the auxiliary battery pack for the Hopscotch. This rig is ready to roll!" he replied.

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[354] Determinate 2 Natural and Manmade Fire Medium.

[355] Trend 1 U.S. Demographic Shifts Medium.

Captain Markham met the other four members of his crew at the captains' table in the bullpen at 0800 hours sharp. Firefighters Joe Springer, Beverly Matthews, and Frank Davis were the firefighter independent duty medics (IDMs), along with Mitchell Nichols as their engineer. The firefighter IDMs would bring the ambulance along with the fire engine on medical calls and leave the engine to transport a patient if necessary. The ambulance would with the fire engine for fire and rescue calls. The fifth element (five-person crew) configuration of the extra firefighter from previous generations of the fourth dimension, or the four-person crew as it was more commonly known, allowed for an adaptive response, or 2fer, designed to keep Fire Service flex capacity high at all times.

Captain Markham fired up the captains' table computer display, which also synched with the wall-mounted electronic displays. The order of business was a standard routine of checking the calendar, a situational awareness brief from Battalion Chief Robert Archer and Physician's Assistant Jeff McDonald, the NOAA intelligence brief, and the *cellavator* brief form the regional fusion center. The operators from the fusion center, also known as cellavators, provided a quick, daily summary of global, national, regional, and local law enforcement intelligence and shoutouts of information and look outs for persons of interest. The morning meeting was jokingly called the "your world in less than five minutes" brief due to the multimedia's ability to convey the leader's intent in a maximum of 60-second briefs on each topic.

Captain Markham, in concluding the meeting and getting ready to dismiss the crew members to their individual assignments, asked, "Is anyone not completely aware of the weather today?"

The response was grins as they pointed at their guardian gauntlets. Springer and Matthews bumped guardian gauntlets as, Matthews said, "We're riding with the wind today!" No sooner had she said that, Captain Markham's guardian gauntlet vibrated with a message to call battalion Chief Archer.

Battalion chief Robert Archer was a grizzled, much-admired, 25-year veteran of the Fire Service. He had come through the explosive growth in technology and had learned the new mantra or adaptive culture developed in the Fire Service as a way to meet

these rising challenges. His mantra of lean forward into the unknowns was an example to all lifelong students of the Fire Service.

"What's up, Chief?" Captain Markham asked when BC Archer picked up his red tooth.

"We have a multiple point fire start on the Southwest aspect of Monterey peak. The cellavators have been tracking a person of interest north of us in Zone 6. The fuel moisture has been too high for anything to take off up there. This appears to be the same arson pattern as previous fire starts in the area. The person of interest will be posted shortly in the Intel discussion room on NICS so that you can see more there. At this point, it's still early in the day, but NOAA is projecting this one will become a wind-driven fire with today's weather forecast. Every available air asset is pulling chocks, and the firefly (unmanned aerial vehicle) is feeding NICS as we speak. We are first up on the Type 1 Strike Team for Zone 3. Eat up, fuel up, and be ready to roll at a moment's notice. All other outside activities have been cancelled by the Fire Chief."

"I'm on it, Chief," Markham replied, waiting until Archer signed off. BC Archer would be busy reaching out to his key resources. Captain Markham punched the paging icon for in-station alert and announced, "Fire start, initial operations, southwest aspect of Monterrey peak, with multiple points of origin." He knew his crew would gear up to double time, while he fired up his NICS account on the "Monte Peak" incident.

As Captain Markham drove code three to the fire, a solitary member of the firefighting force had already arrived. Gaining high altitude in a circular path alternating with steep dives through the head of the Monte fire, the firefly was quickly establishing situational awareness for NICS and NOAA. The Fire Service firefly was a heavyweight, high-endurance, high-altitude, high-wing load, unmanned aerial vehicle. Its origins were rooted in the GNAT of the late 1980s, as a CIA surveillance platform that morphed into the Predator, famous for missile strikes during the 2010s during the Middle East war on terrorism.

Currently, the firefly had come back to its roots. The 35-kilo payload capacity had several configurations available. This initial attack firefly was equipped with a GIS/

Weather pod for NICS/NOAA intelligence gathering. The firefly was most commonly configured with a hopscotch communications package and flew the night watch. The central spar for the wing was a circular tube. Capitalizing on the latest flexible metal technology, the firefly could increase or decrease the wing surface area by rolling the central spar forward or backward. The increased wing area allowed for rapid lift while the tightened effect of wing retraction increased the G-force for which the craft could dive. The firefly was one of three parts on the new fire triangle.

An emerging capability for the firefly mission was a foam bomb mission. Similar to a smoke bomb, the foam bomb created a cloud of fine particle foam in a diameter of approximately 10 meters. These leftover military missiles from the last desert war had been configured by replacing the warhead with a compressed air foam device. The pinpoint accuracy of the weapons targeting package allowed for precision strikes at fire starts. The theory was to defend against dry lightning strikes in remote areas of the forest. The results were still out as to whether the foam bomb stops the fire or the heat from the rocket motor makes it worse.

The second of the two components of the fire triangle were NICS and NOAA. NICS was heavily layered with GIS data. NOAA provided weather platforms from the micro climate modeling on a mountain peak to satellite imaging. With the firefly, a 3D fire ground was created for the IC. The layering technology let an IC see fire resources as icons while infrared surface temperatures and heat plumes from NOAA allowed for moment by moment fire forecasting. With an air wing of six fireflies in a combination of communications and NICS/NOAA pods, communications were lost with firefighters for short periods of time, usually with those who were working close to the head of the fire. The situational awareness for the incident commander and fire resources allows for closer engagement of the head of the fire. The 3D capability of monitoring live feed on fuel, weather, and topography allowed the safety officer to hit a modern-day panic button which relayed immediate bail out instructions to firefighter's in imminent danger with weather and topography changes.

At 1043 hours, Engine 12 was assigned to a Type 1 Strike Team number RFA3081A (regional fire authority). The Monte fire had grown to 200 acres and was

making a run at a canyon community six miles down canyon drainage running west.[356] Battalion Chief Archer was the Strike Team leader and could see by his crews increased heart rates and breathing on his guardian gauntlet that the strike team was pumped up, but not too much. It was rather typical data for an initial dispatch. Once operations started, the biometrics would tell whether his firefighters were maintaining their physical conditioning. The question of the moment for the strike team was what would their assignment be? Would they be bump and running the head of the fire, fire following, or mopping up the rear? Not but moments later, Chief Archer's orders came through: defend the canyon community of Castroville directly in front of the fire.

NICS/NOAA was projecting the fire would spread unevenly uphill on the south aspect of the canyon at Castroville. It would then either go back down the topography or be driven by the wind and jump into the smaller uphill finger canyons where the local high school was located. The Castroville high school was the designated evacuation point for the community. It is located along the top of the ridge line in a natural rock notch that creates a large safety zone. The school was intentionally built there at a higher cost. The Fire Prevention Board Planning Commission report determined the remote location of the town from fire suppression resources required the community to design higher self-reliance resources. This changing role of the individual occurred over time with the backing of the federal government's involvement during K-12 education. Citizens can live in rural areas, but they must provide for a higher level of building codes, realizing the longer response times for Zone fire resources to arrive. All Castroville residential homes had fire sprinkler systems,[357] and the homes located at the edge of the urban interface were also required to have external drip systems draining from the roof ridgeline the ran off of the eves to create a water vapor barrier for fire ember arrest. The water reservoir serves as a dual purpose role as an emergency water supply. The NICS report was that most residents had evacuated to the high school with the report of three families still in their homes.

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[356] Trend 1 U.S. Demographic Shifts Medium.

[357] Variable 4 Threat from Privatization Medium.

Battalion Chief Archer's plan was to deploy his five-unit strike team east along the leading canyon edge of the community and fire follow for spot fires not extinguished by the residential roof drip system. The fireflies would direct them to hotspots on the interior of the community. When the fire drew near, Chief Archer knew he would have firefly support along with a B858 Supertanker. Some older Boeing B858 aircraft had been re-purposed for fire suppression missions once their passenger service life was over. Battalion Chief Archer's concern was for the three families not yet evacuated to the high school. Two families were reported well within the perimeter of the community, whereas the other was on the canyon rim. Chief Archer could also see a Hunter strike team of law enforcement units' number REA3031A (regional enforcement agency). The hunter teams were to assist in evacuations and crisscross the interior of a community and prioritize to firefighter's order of fire attacks. Chief Archer hit a face-to-face in-person meet request for the closest unit. Unit 4414 acknowledged, and Chief Archer could see from the NICS display the vehicle in progress.

As 4414 pulled up to Engine 12, the police officer pointed to the battery pack of his AZPAC. The All Hazards-powered air-purifying respirator with interchangeable filters was standard issue for fire and law enforcement.[358] The technology originated from the CBRNE threats of the 2020s from transnational terrorism. The law enforcement components were using them as repertory protection from the smoke and ash that was raining down on them. Engineer Nichols from Engine 12 went opened a compartment door swapping out the officer's battery pack.

As Battalion Chief Archer walked over to meet the officer who was quickly chugging down some water, the officer recognized his collar rank and started the conversation by saying, "Chief, we got a problem. I've got a senior gentleman in a canyon rim home—beautiful view of the fire headed our way. He's sicker than a dog with food poisoning. His adult daughter and her husband are with him, and he does not look able to travel. We have the other two families on a school bus headed uphill—they're all good."

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[358] Variable 2 Merging of Agencies High.

Chief Archer instantly looked at his NICS/NOAA 3D for the heat plume. At this point, the heat plume was still banking down canyon, which was not a problem with the last evacuation bus. "Where was his go-to guy, Captain Markham?" the chief thought.

Markham asked the officer if he was ready for a bread and butter fire/law enforcement drop and drag. A drop and drag was a joint operation to have fire resources drop straight down the fire line, while law enforcement dragged netted through the neighborhood to evacuate citizens. This operation was regularly practiced with joint training conducted by distributing preparedness flyers through a given community. A big drop and drag in a local community brought out a lot of civic pride in their first responders. There was a lot to be said about building community trust with their firefighters. Government budgets had stabilized with alternative sources of revenue.[359] This had increased trust in government services. The officer gave a thumbs-up and headed east to re-join his hunter team.

While Captain Markham was concerned about the trust with the citizens, Chief Archer knew that his fire captains trusted him to provide a high level of situational awareness. Archer punched up the incident action plan, which was then re-broadcast to REA3031A, RFA3081A, and his division chief. In a matter of seconds, Chief Archer got an approval for the air support request placed in the queue, and the projected impact of fire front was 30 minutes. He then yelled at Captain Markham, "Get over to the house with the sick guy—you talked to the officer the most—and let me know your position, progress, and needs (PPN)."

At the Incident Command Post (ICP), Fire Chief Bradley Stone was the Operations Chief for this incident. Chief Stone sat at his fire watch station, slightly elevated above floor level so that he could get a sneak and peek of his staff's console color changes. When monitors started blooming red, it was time to, "Get the red out!" The holographic projection from his tabletop allowed him to get the same 3D view as everyone else. The three main divisions on his watch floor were the NOAA weather guessers, the NICS dirt divers (a pun on their GIS skills), and his Deputy Chief of

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[359] Trend 4 Government Budgets Medium.

Operation (DCO) responsible for life hazards. There is an old saying, "If the life hazard isn't there when you arrive, then you brought it with you."

All three elements had their own displays for division operations while a 3D monitor was on the front main display. The only drawback was on having to put 3D glasses on to see the image correctly. The Fire Service would never stay on par with the military on the technological track. The Fire Service was getting technology through the purchasing process several generations old. Each firefighting division was constantly posting to discussion rooms and sending out specific request from the individual unit level on the ground. The proximity of the workstations allowed for an audible to be called. In the tension of a fire blowing out, Chief Stone could call out for a specific update, and the response would come at him from the floor. Looking back at documentaries of the early days of NASA space exploration, the operations floor looked much like Houston, with modern technology. The collaborative nature on the floor was such that when one division was getting hammered, another could slide personnel over and fly the back seat to help out in the crunch.

This was also augmented at the individual supervisor level in operations. Off-duty personnel could sign up to fly electronically as wingman for deployed firefighters. The front side of the equation was that a supervisor had a second set of eyes seeing the fire ground from a different perspective, without the heat, hunger, and fatigue that comes with operations. The backside for the wingman was in the ability to participate in a live scenario. There was a lot to learn from being the fly on the wall. Countless documented cases had been recorded where the wingman prevented a near miss or worse by pointing out critical information to the supervisor whose boots were on the ground. Captain Steve Wilson's prediction from that morning was right; he was jealously playing wingman for Captain Markham who was deployed in the field.

Captain Markham paced nervously back and forth in front of a large window overlooking the canyon coming down from Monterey Peak. As Captain Markham clicked his eye pro to smoke mode, the 100-foot wall of approaching flames was coming down the entire width of the canyon. To the west of Captain Markham, the canyon started a hook turn to the south. Engineer Nichols had the fire engine tucked in tight to the house

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with hose lines ready for deployment to the bravo, delta, and Charlie aspects of the house. Engineer Nichols' responsibility was the alpha or front side of the house, and he sat in the driver's seat watching the fire rolling down the canyon on his eye pro. Being Captain Markham's primary back up for crew safety, he was in constant red tooth with Captain Markham. "Hold on tight, here it comes boss!," engineer Nichols yelled.

Firefighters Joe Springer, Beverly Matthews, and Frank Davis had the family in a front room, ready to evacuate on a moment's notice. If the house's fire protection systems failed, two would take up exposure lines, while the rest of the crew would bail out the family. Captain Markham could see the plume modeling from NOAA starting to bank in his direction. Captain Markham's mind was racing, looking at the NICS fuel model for the hillside below him and the calculation that the fire front would only last 37 seconds as it passed by. It was long enough to hold a breath, but an eternity hunkering down beside the 100-foot wall of flames as it passed by.

Operations Chief Stone could see fireflies falling like comets through the front edge of the head of the fire. The firefly would disappear momentarily like a comet as they hit the heat wave traveling over 420 kilometers per hour. The firefly would pop up again in moments on a circular updraft path at less than half their descent speed. The NOAA Division Officer yelled across the floor, "It's banking too hard! It's going to blow over the canyon rim into the neighborhood above!" All biometrics were disappearing from the fire units on the fire line as the heat wave obscured their signals.

"OPTIONS!" Chief Stone yelled to the floor.

An air boss yelled, "I got a supertanker inbound, on last leg of approach."

A weather guesser yelled out, "He's good! He'll bank out north on the final leg with an updraft."

Chief Stone issued one last order, "Get the red out!"

Back in his command vehicle, Battalion Chief Archer had biometrics on all his people as he hung back in the neighborhood. Chief Archer saw the link with NICS/ NOAA going down and toggled his roof mounted burst antenna toward the high school where he last saw a firefly patrolling. Chief Archer's apparatus would start a high

intensity burst transmission to post up intelligence to the nearest hopscotch unit. Chief Archer could see the Boeing B858 coming in on its final leg of approach. A helicopter sling loaded conducting a tactical offensive operation using a heli-torch had started working the other side of the canyon. The heli-torch would lay parallel strips of fire along the fire line moving along the canyon wall. The coordinated fire attack technique was called a *birthday cake* effect. The two fires would draw toward each other creating an even higher wall of flames in the middle. The supertanker laying down a line of retardant with the heli-torch working the other canyon wall would draw the fire away from the Castroville community. Chief Archer's perspective on the fire ground gave him every indication that the birthday cake effect would work. Chief Archer gritted his teeth as the fire approached, just seconds from hitting the canyon rim where his strike team with Captain Markham was deployed.

Across the canyon and at the house, all Captain Markham could see through his eye pro was a continuous wall of flame. Markham quickly walked back to the front door thinking, "It's spilling over." Markham hit his guardian gauntlet to broadcast his unit's direct contact with fire front. Captain Markham took solace knowing that he would get priority air support request for his current position. A priority message flashed into Captain Markham's eye pro from his wingman Captain Steve Wilson. "Do you see the Boeing B858 supertanker inbound on your position?" asked Captain Wilson. Simultaneously, he whipped his head west just in time to see and hear the roar of the B858 scream over his position. The smoke mode of the eye pro was instantly awash in a jumbled color display as the retardant wet line was down along the flank of the fire. He berated himself for getting tunnel vision, losing situational awareness of the larger area, having focused on the problem.

"Yeah, I saw it," Markham grumbled back to Wilson.

Over the next half hour, Battalion Chief Archer coordinated a mop up operation, putting out the spot fires mostly contained to residential landscaping and patio furniture. After the initial wave of smoke had passed with the fire moving west down the canyon, Chief Archer saw a very clean burn with the retardant line in place. Though the NICS guys would verify with fireflies, Chief Archer reported a low likelihood of spot fires as a

concern at his current position. Archer gathered his strike team for a quick eyeball-to-eyeball check, but he already knew their biometrics: hungry and thirsty.

"Captain Markham!" cried Archer, "Is the sick guy still sick?"[360]

"Like a dog," Captain Markham replied.

Chief Archer asked, "What's your plan?"

"Shelter in place, no further action required" Markham replied.

"Anything else?" Chief Archer asked again.

"Well, Chief, I don't think they'll have to cut back their defensible space for a few years!," Captain Markham replied as the other firefighters laughed, blowing off some tension.

"Pack up, we're moving out," declared Archer. "Water and food is up at the high school. Their Community Emergency Response Team is expecting both fire and law enforcement teams."

Citizens had become actively involved in the protection of critical infrastructure.[361] Providing for emergency services for the continuity of the citizenry was an important civic responsibility.

"They are ready to provide food, fluids, and a rest stop for us," Archer said. "Captain Markham put in a request to medical support for a fire IDM to conduct a health and welfare check during the next operational cycle for our sick resident."

With a job well done, Archer thought, "not a bad day to be a firefighter, not a bad day at all."

A.   DRIVERS THAT SHAPED GET THE RED OUT!

The weighting of this scenario uses five of the ten drivers to shape a robust scenario with a vibrant fire service leadership dominating the emergency management sector. This scenario synergizes many drivers to produce a scenario that together provide a

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[360] Determinate 1 Death and Morbidity Medium.

[361] Trend 3 Critical Infrastructure Medium.

look at a fire service that has become highly technical, with extreme communications capability, and the integration of private, public, and the community resources in response to a disaster. This scenario should not be viewed singularly, but in contrast with all three scenarios together. This combination of drivers has been chosen to create a plausible narrative that would not follow the normative of projecting/forecasting more of the current delivery of Fire Service. Table 3 shows the drivers that shape Scenario 3.

Table 3.   The Get the Red Out! Drivers

GET THE RED OUT!	SCENARIO 3
Determinants	**Weight**
Death and Morbidity	Medium
Natural and Manmade Fire	High
Variables	**Weight**
Merging of Agencies and Homogenized Training	High
Threat from Privatization	Medium
Trends	**Weight**
U.S. Demographic Shifts	Medium
Universal Access to and Use of Information	High
Critical Infrastructure	High
Government Budgets	Medium
Technological Development and Dependency	High

1.   Potential Strategies for Addressing the Scenario

The suggested potential strategies are a few examples based upon the author's experience and own ideas. This scenario is meant to spark discussions among a variety of

participants to deliberate potential futures and many other courses of actions that could/ should be taken now to address them.

Fire Service leaders who see this plausible scenario as a desirable future would have to adopt a strategic plan that calls for increased training of personnel. While the technology in the narrative is futuristic, the human component of operating the equipment is not. Tactically, several elements would have to be developed to support this strategy. The workforce of the Fire Service would need to receive a significant amount of training through delivery at a regional or state facility to homogenize standards. The legal processes of creating single jurisdictions or fire service agencies would need to start at the smaller city level and progress to county-wide or state-wide fire departments. The Fire Service would need to look at employment standards for accession and recruitment through higher educational standards.

Fire Service leaders who see this plausible scenario as a desirable future would have to posture for increased education and training of the workforce in information technology. Tactically, several elements would have to be developed to support this strategy. The workforce of the Fire Service would need to become information technology subject matter experts. The Fire Service would need to posture to become the de facto leaders during disasters organizing and tasking all available public, private, and community resources. It would have to develop the workforce into an intelligence-driven strategist to deploy into a cohesive fighting formation within large geographic areas. The Fire Service would need to prepare to become the sector leader of emergency management.

To anticipate this plausible future, Fire Service leaders would need to begin posturing now for increased information technology. This IT capacity would be highly integrated into a cohesive situational awareness of all members on the fire ground. Individual members would be the direct information collectors for the IC; the developer of the comprehensive disaster containment strategy. Fire Service leaders who see this as a negative plausible future should posture to provide recommendations to government leaders and elected officials on the limitations of the current capacity of the Fire Service. Fire Service leaders who see this as a positive future should posture to develop a robust IT workforce capacity. Fire Service leaders who take no action on this plausible future

could struggle the inability to meet emerging mission requirements and interoperability challenges with progressive resources. These three thoughts are the beginning of "what if" conversations to embrace, reject, or ignore this plausible future scenario for the Fire Service. If conversations start due to this scenario about the strategic future posture of the Fire Service, then futures methodology has produced a successful outcome.

IX. SUMMARY AND DISCUSSION OF SCENARIOS

Three plausible scenarios were created using futures methodology. The drivers that shaped these plausible scenarios were developed using a replicable methodology that is specific to the Fire Service's need for strategic future planning. Futures methodology is constructed to provoke "what if" questions about the plausibility of the scenarios. By developing multiple scenarios, the reader is able to see contrasting plausible futures. Allowing the reader to contemplate contrasting plausible futures, decisions can be made now on desired or undesirable futures. Thinking through plausible future scenarios allows decision makers to think through actions they might take should the scenario come to pass. Thinking through plausible scenarios prior to their occurrence allows for a faster response time by decision makers. Futures methodology is not intended to provide answers or solutions to the plausible scenarios. By leaving the "what if" questions open, the desired outcome is to provoke strategic conversations that would allow decision makers to take action to shape a desirable future and sustain relevance as a sector leader. The Fire Service could use futures methodology as a standardized scientific strategic planning process. Table 4 is a compilation of all three plausible strategic scenarios and highlights the drivers that shape the narratives.

Table 4.   Comparative Table of Scenario Drivers

THE FUTURE OF FIRE DEPARTMENT 2.0	SCENARIO 1 "THE CENTURIONS"	SCENARIO 2 "NO CODE RESPONSE"	SCENARIO 3 GET THE RED OUT!
Determinants	**Weight**	**Weight**	**Weight**
Death and Morbidity	High	Low	Medium
Natural and Manmade Fire	Low	High	High
Variables	**Weight**	**Weight**	**Weight**
Merging of Agencies and Homogenized Training	Medium	Low	High
Threat from Privatization	Low	High	Medium
Trends	**Weight**	**Weight**	**Weight**
U.S. Demographic Shifts	High	Low	Medium
Universal Access to and Use of Information	Medium	Low	High
Critical Infrastructure	Medium	Low	High
Government Budgets	Medium	High	Medium
Technological Development and Dependency	Medium	Low	High

X. CONCLUSION

If we have learned one thing from the history of invention and discovery, it is that, in the long run—and often in the short one—the most daring prophecies seem laughably conservative.

—Arthur C. Clarke,
British science fiction author

Strategic conversations should occur prior to changes in the Fire Service. Scenario planning fosters collaborative conversations in a non-confrontational manner produce an in-depth study of an industry sector. Studying plausible future Fire Service outcomes allows for better decision making. The robust future of the Fire Service could depend upon leaders who proactively embrace a culture of adaptation in a world subject to disruptive change. The Fire Service has always been excellent at solving problems in a crisis. Scenario planning will allow the Fire Service to develop new mental models to work through problems prior to disruptive changes. Strategically, enterprises are more likely to weather a future disruption by establishing adaptive cultures for alternative futures while still addressing the needs of today.[362]

The Fire Service is facing emerging trends that create an uncertain future for traditional models of service delivery. Schwartz found that individuals rarely shape cultural shifts.[363] Collective changes in mental models and thought processes of companies, institutions, and nations ultimately drive cultural shifts. The intention of this paper was to introduce futures methodology as a process tool to address complex problems with uncertain futures.

Futures Methodology can address a wicked problem, "a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large

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[362] Raynor, *The Strategy Paradox.*

[363] Schwartz, The Art of the Long View.

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economic burden, and the interconnected nature of these problems with other problems."[364]

Tension between labor unions, management, and elected politicians represents the current relationship of the different stakeholders. Maintaining the status quos of the current Fire Service geographical deployment model known as NFPA1710/1720 may miss emerging opportunities for future growth in the Fire Service. This consensus standard evolved over time and was largely established by labor unions and private institutes. Challenges to the current deployment model causes paralysis in conversations between the stakeholders for emergent opportunities. Scenario planning is offered as a way to begin having strategic conversations about the future shape of the Fire Service. The collaborative nature of this process tool creates a non-confrontational environment capitalizing on creative diversity to seek better solutions than what could be developed by an individual.

One measure of success with futures methodology would be to provide a start for further research of emerging trends and how they could affect strategic conversations.[365] Increasing the strategic conversations through a non-confrontational manner has the potential for changing the mental model of an organization. Individuals rarely create adaptive cultures by themselves. A strong leader can bring together all parties for scenario planning. By changing the mental model of an organization, the current stakeholders' change in perception on emerging mission growth opportunities could result in more productive recommendations and suggestions as the conversation continues.[366]

The development team for the scenario building should include three sets of people: upper management composed of those who make and implement decisions; a broad range of representatives from across the business's functions; and imaginative

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[364] "An Introduction to Wicked Problems," Wicked Problems: Problems Worth Solving, accessed January 15, 2014, https://www.wickedproblems.com/1_wicked_problems.php.

[365] Ibid.

[366] Ibid.

open-minded individuals who work well in group settings.[367] Scenario planning relies upon the input from different stakeholders who will take ownership of the process. Without the commitment to the process and ownership in the outcome, the process will be unsuccessful.

This paper was not intended to offer up solutions to current problems of the Fire Service at large. Futures methodology is intended to be an "unfinished creative work," a term used in the world of art. By not providing an ending or solution, the reader is troubled to purposefully think and complete an answer. This paper provided examples of strategies with supporting tactics. The nature of a master's thesis project requires the author to show competency by revealing the craft of choice architecture in the development of the narrative plausible scenarios. In the intended setting of futures methodology, a diverse group of representative division heads would have provided the wider participation to develop drivers and strategic plausible scenarios. The intent of the methodology is to provoke decision makers to start planning now to sustain business sector leadership in the future.

There is a common cycle of how innovative ideas are processed into implementation plans. The creative innovator gets immediate rejection on "out of the box" ideas from creative adapters. Innovators have a tendency to agitate adapters with disruptive ideas. The paradox of the innovator is that those who are often closest to the problem cannot see the problem from a different perspective. As innovative ideas become memes through discourse, those ideas gain traction with adapters. Adapters are far more adept with implementation plans. The creative strength of the adapter is in how they can imaginatively implement ideas. The symbiotic relationship between adapters and innovators lies in their separate creative strengths. Scenario planning places a group's creative diversity into a process that values differing ideas and perspectives. The magic lies in creating a collaborative process that builds a relationship between people who have the ability to create ideas with those whose creativity lies in the ability to implement ideas.

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[367] Ibid.

The futuristic scenarios presented plausible futures for the Fire Service. The determinants remain eternal as there will always be uncontrolled fire and people will need pre-hospital medical attention. The variables used were those elements that could move either up or down in a 50/50 manner. Variables examined in this paper were self-identified by the Fire Service leaders: budget pressure, consolidation of agencies, desire to homogenize training, and the threat from privatization. Assigning different weights to these factors allows the futurist to create plausible scenarios with differentiated outcomes. The goal is to give our Fire Service leaders the ability to spend time engaging in strategic conversations about how they would react to "what if?" plausible future scenarios. The goal of scenario planning is to think through plausible scenarios before they happen in order to make better decisions should they occur and to nudge a company into a strategic direction. Particular scenarios could be viewed as desirable or undesirable futures for the Fire Service.

This thesis demonstrates how scenario planning can be used as a process tool to provoke Fire Service leaders to take action steps. Will plausible strategic scenarios be a means to motivate all stakeholders into a collaboration effort? That remains unknown, but perhaps this work could be a springboard for the Fire Service to embrace an adaptive culture that will be open to new ideas.

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